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Number 3.

MARCH, 1900.

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TEXTILE WORLD,

and
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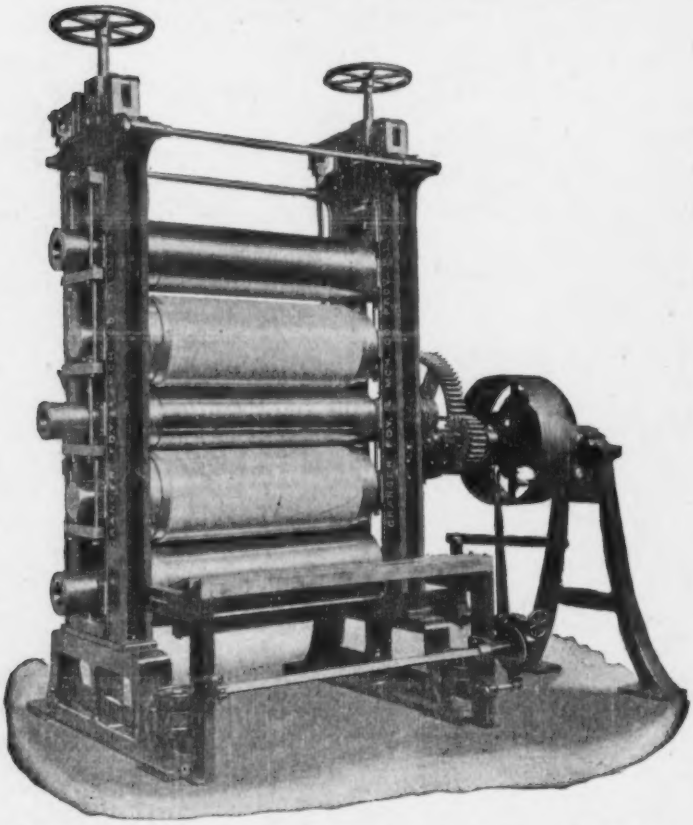
PUBLISHERS.

620 ATLANTIC AVENUE,
BOSTON, MASS.

Bleaching, Dyeing, Drying,

And Finishing Machinery.



CALENDARS, MANGLES AND ROLLS.

TENTERING MACHINES,
MERCERIZING MACHINES.

Granger Foundry and Machine Co.

PROVIDENCE, R. I.

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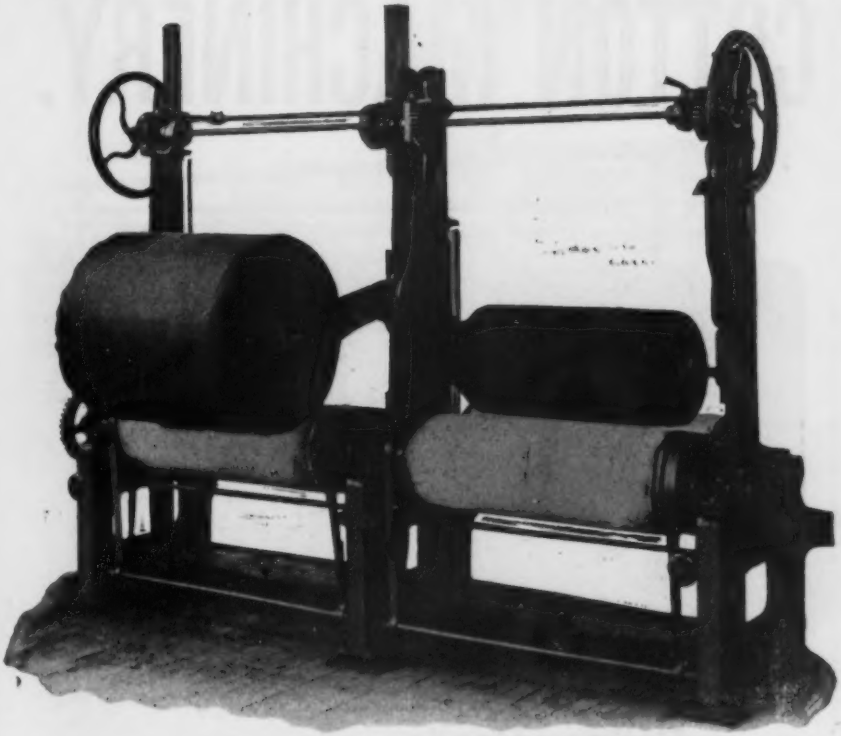
BLEACHING, PRINTING, DYEING AND FINISHING

MACHINERY,

For Textile Fabrics



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W. P. SIMPSON, Patentee.

FOR USE IN CONNECTION WITH

Singeing Machines. Soaping Machines, Drying Machines, Etc.

No stoppage or even "Slacking up" of the machine is necessary.

Cutting is done close to the seam, thus eliminating waste.

As creased ends are avoided at beginning and end of roll, no refinishing is necessary.

One man can attend two or more Winders, as the new roll is started automatically, and completed roll can be removed at convenience.

H. W. BUTTERWORTH & SONS CO.

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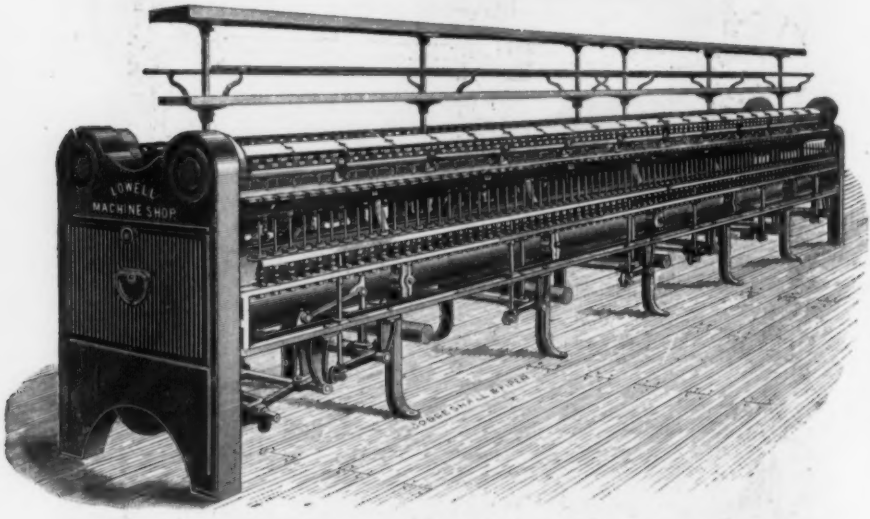
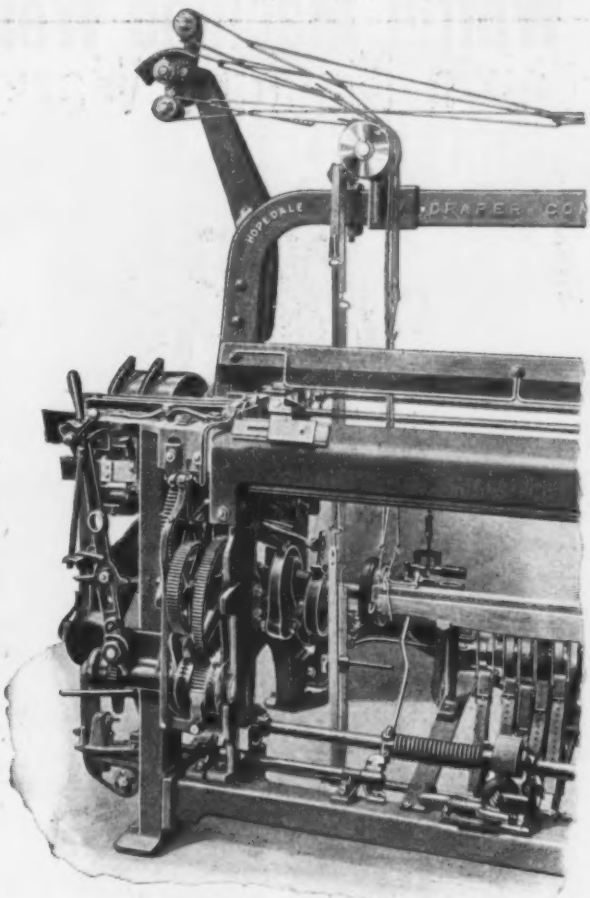
Lowell, Mass.,

COTTON MACHINERY.



Revolving Flat Cards,
Railway Heads,
Drawing Frames,
Roving Frames,
Ring Spinning Frames,
Twisters, Spoolers,
Warpers, Slashers,
Looms.

WORSTED MACHINERY.



A Few Details

Of one of our recent constructions in

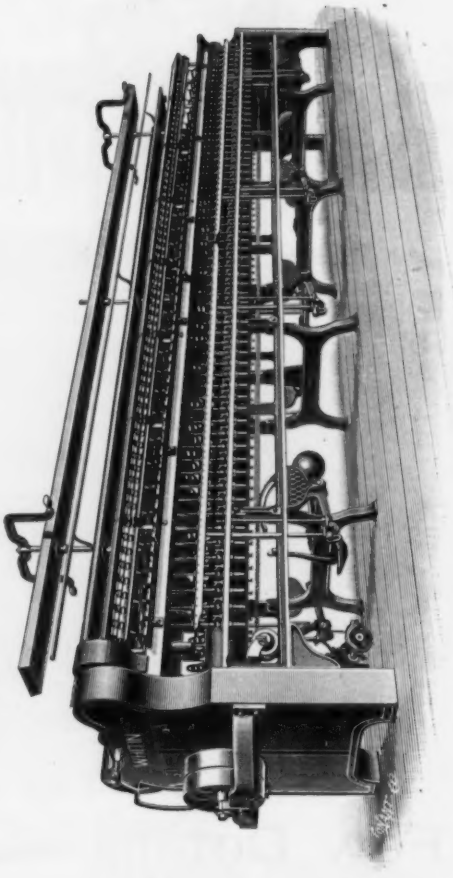
NORTHROP LOOMS.

WE INVITE CORRESPONDENCE.

THE DRAPER COMPANY, Hopedale Mass.

The Whitin Machine Works,

Revolving Flat Carding Engines, Railway Heads,
Long Chain Quilling Machines, Drawing Frames,
Wet and Dry Twisters, Reels,
Looms, Spoolers.



The New Whitin Ring Spinning Frame.

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Southern Office: 38 So. Tryon St., Charlotte, N. C.
S. W. CRAMER, Southern Agent.

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AMERICAN MACHINE COMPANY,

LIMITED.

COTTON MACHINERY.

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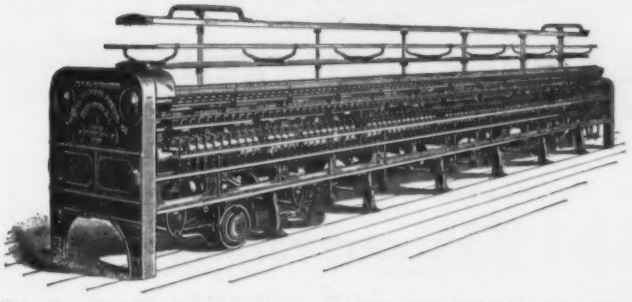
REVOLVING FLAT CARDS
DRAWING FRAMES With Mechanica or Electric Stop-Motion.
SLUBBING FRAMES
INTERMEDIATE FRAMES
ROVING FRAMES

Improved New Pattern Spinning Frames.



This New Pattern Spinning Frame contains many valuable improvements which will certainly interest you and pay you to investigate. All parts are specially designed and so constructed as to obtain the highest speed and greatest production.

We Invite Investigation and Comparison.

THE FISHER CARD FEED

for WOOL, SHODDY, and COTTON, is

Second to None

on the market. It holds more stock, requires less space, and needs no "attachments."

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Spinners of Worsted Yarns. Mixes and Fast Colors Specialties.
Boston Office, 570 Atlantic Avenue.

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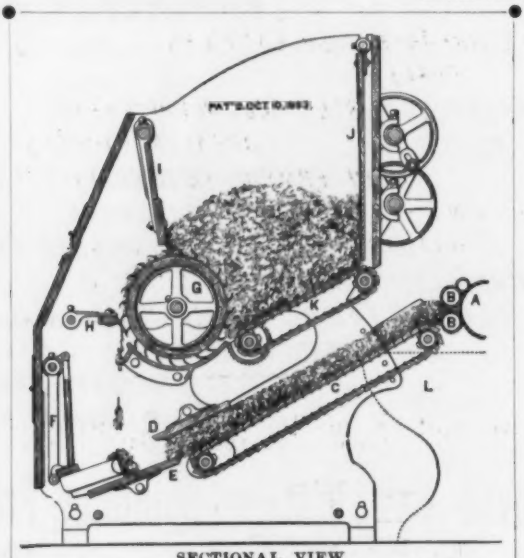
GENTLEMEN—In answer to your inquiry of to day as to how we like the FISHER FEEDS would say that, after running one for three months and having put in four more since, is sufficient evidence that we consider the Fisher Feeds the best in the market to-day, and you are at liberty to bring any interested person into our mill to see them running and judge for themselves. Yours truly, WOONSOCKET WORSTED MILLS,
EDWIN FARNELL. Agent.



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Worsted Yarns.
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WOONSOCKET, R. I.

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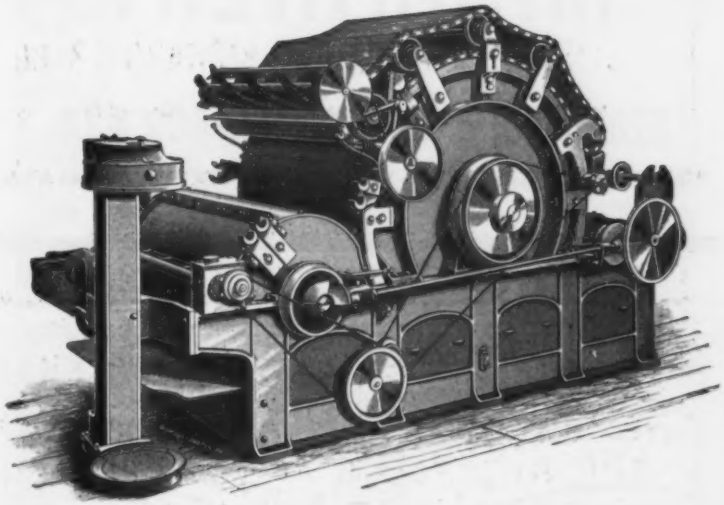
TAUNTON, MASS.

COTTON MACHINERY



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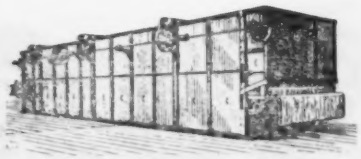

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For Hosiery, Underwear, Yarn, Cotton Stock, Wool, etc.

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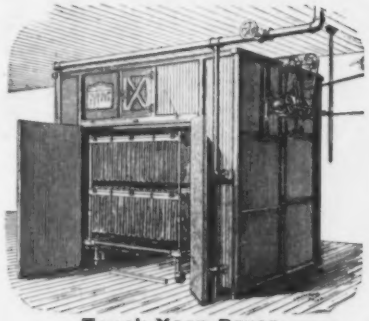

Truck Yarn Dryer.

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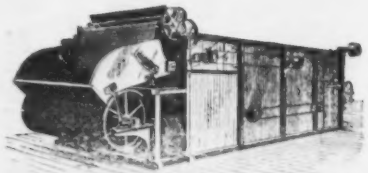
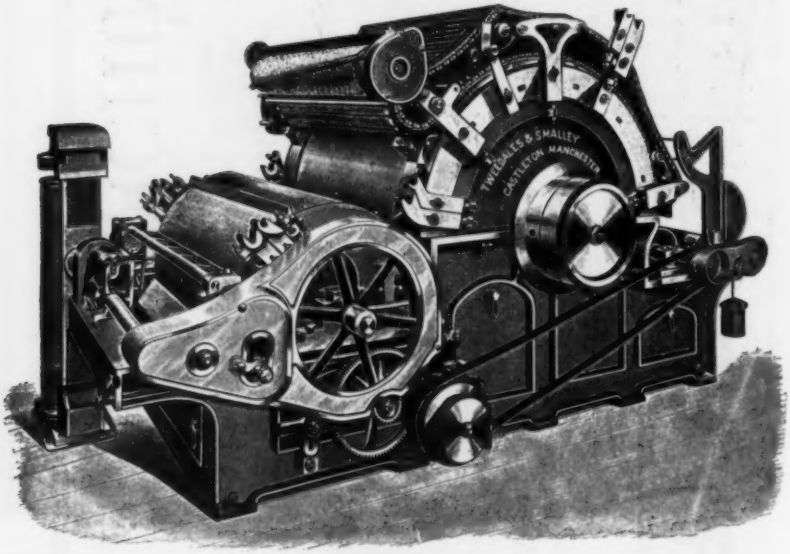
PHILADELPHIA, - PENN.



Automatic Cotton Stock Dryer.

GARNETT MACHINES

COTTON MACHINERY



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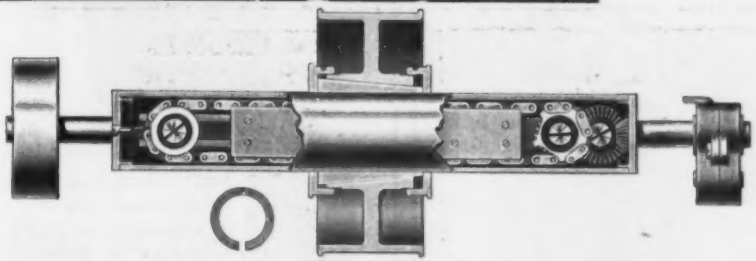

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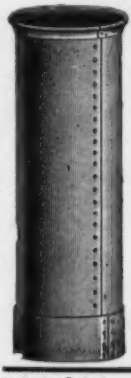

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Sews any fabric, wet or dry, thin or thick, ne stitch or coarse stitch.
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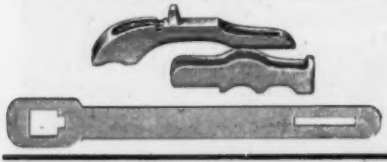

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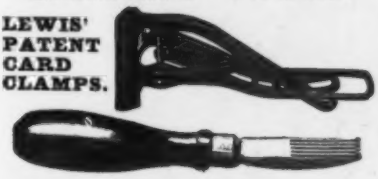

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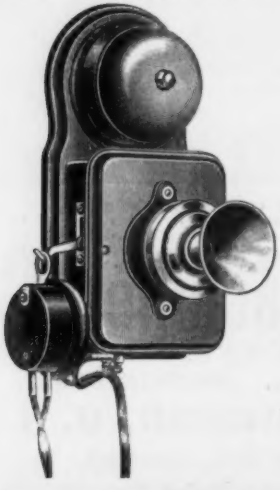

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Should be used in all well-regulated factories.

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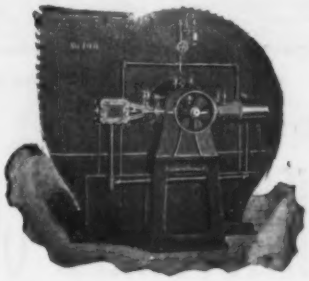

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List of Textile Patents.

Issued January 30, and February 6, 13 and 20, 1900.

Bobbin Making Machine. 643,960. Alexander M. Grimond and James Creighton, Dundee, Scotland.

Cotton Chopper. 643,034. Henry Bartels and Louis Bernhard, New Braunfels, Tex.

Cotton-Opening Machines, Lap-Roll Tension for. 643,295. Frederick H. L. James, Pawtucket, R. I., assignor to the Saco & Pettee Machine Shops, Newton, Mass.

Cotton Press. 643,955. Henry L. Whitman, St. Louis, Mo.

Cotton Press. 643,152. Hartwell M. Parker, Fry, N. C.

Fabric, Woven. 642,971. Levi Fish, Preston, England.

Fabric, Woven. 642,084. Frank M. Clark, Tilton, N. H., assignor of one-half to William I. Holmes, Boston, Mass.

Fibres, Etc., Process of Treating, to Imitate Silk. 643,923. Eduard Ungnad, Rixdorf, Berlin, Germany.

Jacquard Cards, Machine for Lacing. 642,371. Vernon Royle, Paterson, N. J.

Jacquard Cards, Work-Holder for Lacing. 643,827. Vernon Royle, Paterson, N. J.

Knitting Machine. 643,997. Wilhelm Bach, Apolda, Germany.

Knitting Machine, Circular. 642,579. Henry Brown, Philadelphia, Pa.

Locking Device for Cotton Beaters. 643,277. Cyrus E. Smith, Fall River, Mass., assignor to the Draper Company, Portland, Me., and Hopedale, Mass.

Loom. 643,271. James H. Northrop, Tustin, Cal., assignor to the Draper Company, Hopedale, Mass., and Portland, Me.

Loom. 643,704. Adolph Widmer and Samuel Widmer, Paterson, N. J.

Loom. 642,946. Horace Wyman, Worcester, Mass., assignor to the Crompton & Knowles Loom Works, same place.

PATENTS DESIGNS TRADE-MARKS AND COPYRIGHTS OBTAINED

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Loom for Cross-Weaving. 642,359, 642,360 and 642,361. Isaac E. Palmer, Middletown, Conn.

Loom for Weaving Pile Fabrics. 642,740. Adrian Duquesne, Paris, France.

Loom-Harness. 643,509. Wm. S. Lackey, Haddonfield, N. J.

Loom, Needle. 643,902. George F. Kuett, Paterson, N. J., assignor to the American Automatic Loom Company, of New Jersey.

Loom, Needle. 643,878. David J. McDonald, Dundee, Scotland.

Loom-Picker Attachment. 643,816. Robert L. Durham, Burlington, N. C.

Loom Shuttle. 642,837. Daniel M. Burgess, Ramseur, N. C.

Loom Shuttle. 642,388. Henry Tomlinson, Lawrence, Mass.

Looms, Guide Lever for. 643,657. Louis A. King, Salem, Mass.

Looms, Harness Controlling Mechanism for. 642,908. Gustav Kremer and Emil Monhof, New York City.

Looms, Shedding Mechanism for. 643,964. Edmund Ingraham, Philadelphia, Pa., assignor of one-half to the Fairmount Machine Company, same place.

Looms, Take-Up for. 642,686. Charles Fischer, Wm. E. Fischer, and George F. Kuett, Paterson, N. J.

Looms, Take-Up Mechanism for. 643,284. Alvah W. Clement, Hopedale, Mass., assignor to the Draper Co., same place, and Portland, Me.

Looms, Dobby for. 643,021. Wm. B. White, Jr., Colne, England.

(Continued on page 509.)

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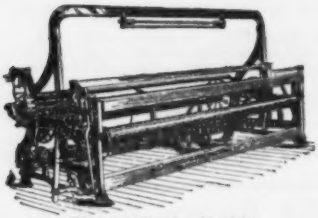

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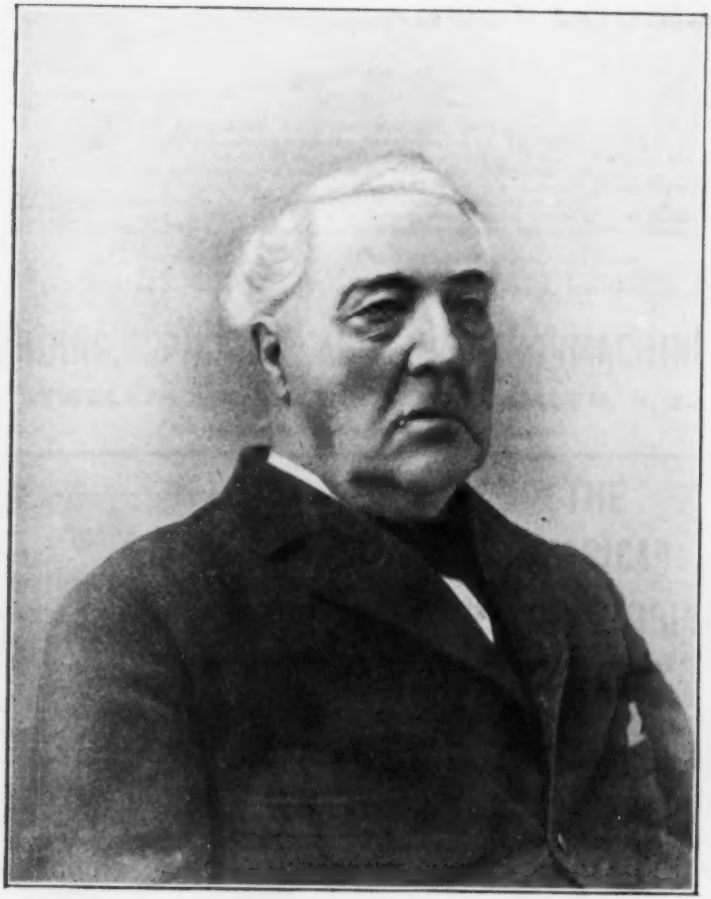


HENRY A. DENNY.

TEXTILE WORLD.

Vol. XVIII. MARCH, 1900. No. 3.

HENRY A. DENNY.

The subject of this notice is the late Henry Augustus Denny, who died at Belchertown, Mass., Dec. 11th, 1899, at the age of 97. He was a native of Leicester, Mass., and was formerly largely engaged in the card clothing industry in the town which has been closely identified with the rise and development of hand and machine card clothing manufacture in this country.

Henry A. Denny was born in Leicester, Oct. 10, 1802, the son of Joseph Denny and great grandson of Daniel Denny, a native of Coombs, Suffolk County, England, one of the earliest settlers in Leicester. Joseph Denny, himself a card manufacturer, gave three sons to this important industry, Henry A., the subject of this notice, Joseph A. who entered the business in 1826 as a partner with Capt. Isaac Southgate, and afterwards connected with Dwight Bisco under the firm name of Bisco & Denny. In 1857, their sons Chas. A. Denny and George Bisco entered the firm and continued the same after the death of their fathers. The company is now in the American Card Clothing Co., of which Chas. A. Denny is president and general manager. The other and younger son, Christopher C. Denny, entered the card clothing industry in 1850, in partnership with Alonzo White, under the firm name of White & Denny, carrying on business in a portion of the factory building of Henry A. Denny, and in 1854 purchased the business of Henry A. Denny & Sons. In 1868, Christopher C. Denny disposed of his interest in the business to H. Arthur White who continued it under the firm name of A. White & Son.

In 1823, when twenty-one years of age, the subject of this notice commenced the manufacture of hand-cards with Emory Drury. In four years they dissolved and Mr. Denny continued alone until he went into co-partnership with Reuben Merriam. In 1836, Mr. Denny purchased the plant of Alden Bisco which had previously been conducted by Cheney Hatch. The machinery of the factory was driven by a large circular wheel propelled by a mule, Mr. Denny having two of this species for the purpose. As business increased and new card machines were added he found that mule power was about as erratic as the long eared animals walking upon the wheel. As mules when drawing loads upon the road will frequently reach the conclusion that it is best to stop, so these mules upon the wheel, taking their steady walk without making a foot of progress, failing to understand the necessity of further tramping, maliciously place the side of the body upon the starboard side of the wheel with their forelegs planted firmly to the front, causing a slow-down and final stoppage of the machinery of the factory. This became intolerable and Mr. Denny, always a progressive and up-to-date man, put in a boiler and steam engine which was the first steam power used in the propulsion of card clothing machines. Before Mr. Denny put in steam power, other card machinery was propelled by water power, horse power and one factory in town depended upon dog-power.

For many years, up to about 1845, American manufacturers were dependent upon English makers of card clothing for the article known as dia-

mond pointed filleting clothing. The demand for it was large and increasing, and as no American machinist was able to build machinery for its manufacture, the English card clothing makers monopolized the business. Mr. Denny determined, if possible, to circumvent this smart set of English competitors. He was placed in communication with a competent veteran card clothing machinist in England and a fine diamond-point machine was purchased. The laws of England did not permit an English machine to be exported. A very large hogshead was then procured, and into this the precious machine was deposited, and over it melted wax was poured, when it presented the appearance of a hogshead of very fine wax, and as such it was duly entered for exportation at the custom house, and was duly received in this country, and brought to Leicester, accompanied by Joseph Farrar, the English machinist. A room about ten feet square was erected in the southeast corner of the machine room, and in that, properly protected, the new machine was placed, without being seen and examined by others than the members of the firm and Mr. Farrar. For several years this machine turned out the only diamond pointed filleting made in America, and Mr. Denny and his sons for a time, had a monopoly of such manufacture.

Mr. Denny, in 1849, received into the firm, his two sons, J. Waldo and William S. Denny. The elder Mr. Denny was much interested in public affairs, was for many years the moderator of town meetings, selectman, and in 1846 represented the town in the legislature. He was also president of a Worcester fire insurance company and general manager of the Cold Spring Iron Works in Berkshire County. In 1854, the card clothing business was, as it had been for at least two years, unprofitable, due to the fact that the manufacturers were unprotected from the large importations from England, her manufacturers flooding the country with cheap labor card clothing which could be placed upon our market at a less price than it was profitable to manufacture it here. The business was closed up, disposing of the property as previously stated to White & Denny.

The manufacture of card clothing since the beginning of the nineteenth century has evolved from an exceedingly primitive condition to a wonderfully perfect system in all its various departments. In 1785, its manufacture was confined to hand-cards. Machine cards were commenced by Pliny Earle at Leicester in 1790. Leather was exclusively used for many years. The holes for the teeth were pricked by hand with two needles fastened to a handle. The teeth were cut and bent to the proper "pitch" by a machine. When thus prepared, the leather sheets (main cylinders) and filleting with required quantity of teeth, were delivered at the houses of the people of Leicester and neighboring towns to be set, i. e., the teeth to be set in the leather. When done, the cards so set were called for. During many years the subject of this notice spent much of his time in delivering the unset cards to the families, and collecting them when set. Most of the boys and girls of that period, had to perform many a stent upon these unset cards before they were privileged to go out to play. In most families of children, the "cards" had to be set, and the stent was a hard one for those who loved the open air of the country.

—The technical school takes the place of the old apprenticeship system, and its purposes must be regarded as meritorious and tending to an improvement of those who work in the mills.

—The hands have had more to do in moulding the brain, than the brain in moulding the hands; manual training develops the brain, on which depends all intellectual operations.

INDUSTRIAL COMBINATIONS.

The Industrial Commission has made a preliminary report to congress on trusts, or combinations. A large portion of this report is devoted to a review of the evidence which was presented to the commission, with features of interest showing the impressions made upon its members of the advantages and disadvantages resulting from the operation of large industrial combinations. Some of the comments made on these points can be subscribed to very readily by business men. A very apparent advantage of these combinations is that of centralization, by the possible closing of individual plants unfavorably located, or poorly equipped, and the concentrating of production into the best plants, most favorably located, thus effecting a great saving in cost and in the amount of capital necessary for the conduct of business. Besides this, the business can be better arranged so as to come under a single management for the greater efficiency and simplicity of operation. Among other advantages named by the commission is the better command and utilization of business skill, and a finer specialization to the exact needs of manufacturing. This admitted advantage has, however, we think, its limitations, as it is patent to everyone that hired managers, as must largely be the case, will not take the same interest in methods of economy or exert the same intelligent control as the owners of comparatively small establishments. Still, on the whole, we are inclined to think the views of the commission are well taken. A conspicuous disadvantage of vital consequence, of these combinations, in common estimation, is their monopolistic effects upon trade, minimizing competition, and stifling the life and chief incentives of trade, and otherwise inconsistent with the popular idea of what is best for the individual. Great business combinations militate against young men entering into business independently.

Whatever the advantages or disadvantages of combinations may be, the fact must be recognized that they are the natural outgrowth of modern conditions, and that it is practically impossible to suppress them. The commission thinks that if any legislation is needed, it should be in the form of regulation and publicity only.

Many of those who testified before the commission were of the opinion that a much greater publicity regarding the affairs of industrial combinations, than is now customary, would tend to remove many of the evils. A knowledge thus secured for the general public would, undoubtedly, have a tendency to prevent the maintenance of extortionate prices, as well as unfair methods and conditions of competition. Stockholders and investors would also be protected against abuses by promoters and officers of corporations. The commission, however, suggests no specific remedies requiring legislative action, and the degree to which publicity should extend is a matter upon which there seems to be no general agreement in the evidence obtained from witnesses.

Incidental to these comments on the part of the commission, is the bill that has recently been presented to the State legislature of New York, drafted by Prof. Jenks, of Cornell University, affecting these new conditions that control large corporations. Prof. Jenks has given much expert testimony before the Industrial Commission, and elsewhere, regarding legislative restrictions that should be placed upon these new methods of doing business under the corporation laws of a number of States, especially those of New Jersey, Delaware and Virginia. Among the features of the measure proposed by Prof. Jenks, is the placing of power in the hands of stockholders to examine into corporate accounts, and allowing stockholders the right to a statement of the salaries paid to any officer or officers of the company, as well as a statement of all agreements in which any

officer of the company is or has been interested. The measure forbids the directors of the corporation to raise salaries between annual meetings of the stockholders, at which meetings the salaries must be fixed. It also requires that every prospectus shall give detailed information as to the names of promoters, what amount of stock, if any, is paid to them, or what commissions are paid, besides the complete detailed terms of any contract.

The purpose of Prof. Jenk's measure, or that of the bill framed according to his suggestions, is to provide a separate and distinct act by which new or old corporations may come in or stay away. There is nothing compulsory about it. Such measures can be viewed in no other light than suggestive, or tentative, at best, and should receive careful deliberation before they are enacted into laws, so that they shall not have the effect of becoming paternalistic.

There is no dispute regarding the power of states to pass laws of this character, but it is not so clear as to the powers of congress to pass such regulating or restrictive laws. In all matters, however, affecting interstate commerce, there is admittedly no doubt of congress possessing constitutional powers for controlling the business operations of corporations; yet at the same time, we think no one will say that congress has power over purely manufacturing corporations not engaged in interstate business, though this may be considered as practically of no consequence, as no large corporation can confine its business operations within the confines of a single state.

The report of the Industrial Commission takes up the matter of overcapitalization, which has now reached an enormous sum, well into the billions, and in the majority of cases the nominal capitalization of the corporations far exceeds the cash value of their property. The report says: "If the plant shows that its earning capacity is sufficient to pay dividends on the large capitalization, the stock will hold its value fairly well, and the capitalization is justified. If the earning capacity of the establishment is not sufficient to pay dividends, this condition will show itself in the value of the stocks. . . . The attempt to pay dividends on the inflated capitalization seriously affects the prices of the products to consumers and the wages of employees."

Again, incidental to this report of the commission, a few statistical facts concerning industrial consolidations may not be without interest. The New York Journal of Commerce, in one of its recent issues, presented some statistics relating to combinations of allied industries for the last forty years, showing that over four billion dollars in aggregate capitalization has been reached. Sixty per cent. of this is represented in preferred stock, 27 per cent. in common stock, and thirteen per cent. in bonds. The most active period for these consolidations was during the year 1899, when the capitalization reached the sum of $1,700,000,000, nearly one-third of which was preferred, and two-thirds common, including bond issues of $127,000,000. This amount of capitalization is the value of the stock and bond issued, and not the full amount of that authorized to be issued, and does not include consolidations of railroad and street railway companies.

According to industries, consolidations have taken place, notably within recent years, capitalized in a few leading instances as follows: Iron and steel, $575,000,000; liquors, spirits, etc., $230,000,000; textiles, $203,000,000; tobacco, $190,000,000; cars, $157,000,000; leather, $150,000,000; and oils, $140,000,000.

As will be inferred from the above, there has been an immense amount of over capitalization, the chief cause of which, in the opinion of the Industrial Commission, comes from the high remunerations that are secured by promoters and by the underwriters of the

stock when the combinations are made. Two instances may be mentioned of this character, that of $10,000,000 common stock paid to the promoters of the American Tin Plate Company, which is capitalized at $36,325,000, of which $28,000,000 represents common stock; and of $5,000,000 common stock paid to the promoter of the National Steel Company, which was capitalized last year at about $50,000,000, of which $32,000,000 represented common stock.

TARIFF ON PORTO RICO IMPORTS.

The imposition of customs duties on merchandise imported from Porto Rico into this country is one of much greater importance than the simple fact of charging such imports with duties. Constitutional questions of vital significance are involved, affecting the political relations between the United States and our new possessions obtained by treaty and conquest from Spain. The constitution of the United States has been found elastic enough to meet all political questions that have thus far arisen in our government, requiring, however, the helpful interpretation of the law by the highest judicial power. Before a satisfactory settlement of the legal status of the political relation between the United States and our new acquisitions is determined, test cases will have to be formulated for adjudication by the Supreme Court of the United States. This is likely to occur as covering one phase, at least, involved in an importation of merchandise that has come before the Board of General Appraisers for an opinion as to whether Porto Rico is or is not a foreign country, for tariff purposes. The opinion of this Board, as rendered by Judge H. M. Sommerville, is to the effect that the treaty by which Porto Rico was ceded to the United States, by Spain, became the supreme law of the land, within the meaning of article 6, section 2, of the United States Constitution, as an act of Congress is, only so far as, not being merely executory, it prescribes a rule by which the rights of the private citizen or subject may be determined and enforced in a court of justice. In other respects, it addresses itself to the political, and not to the judicial department of the government. The cession of Porto Rico to the United States did not bring that island within the operation of the general tariff laws of the country without special congressional legislation on this subject. Judge Sommerville makes the important statement that "until congress, by special legislation, extends the general, or other tariff laws, over such newly acquired territory, and establishes therein collection districts, with ports of entry and clearance for vessels, the island, for tariff purposes, remains a foreign country, and its ports are not domestic ports, however the island may be viewed in its international relations." Judge Sommerville does not undertake to express an opinion whether Porto Rico would fall within those provisions of the constitution that provide that "all duties, imposts and excises shall be uniform throughout the United States," had congress undertaken to exercise its constitutional right to pass laws for the government of its newly acquired territory, and had passed a tariff act extending over the island, with rates of duty different from those imposed by the general tariff laws applicable to other parts of the country.

The President and the House of Representatives have committed themselves to the idea that Porto Rico is, in its political relations to the United States, a foreign country, or more properly a dependency of the United States, subject to special legislation by the congress of the United States. The query is: Does the constitution permit of the United States governing any country or province as a dependency, or something not an integral part of itself?

The purposes of the bill that is now before congress, imposing a duty of 15 per cent. of the rates enumerated in the Dingley tariff bill, are to raise revenue to relieve the distress and

meet the imperative needs of the people of Porto Rico. It is the intention to return all such duties collected to Porto Rico, for conducting the government there, and for the extension of public education, and for other beneficial objects. Consistent with this plan of relieving the situation existing in Porto Rico, a bill is now before congress having for its avowed purpose the returning to that island the sum of over $2,000,000, which have been received as customs revenue on importations by the United States from Porto Rico, since the evacuation of that island by the Spanish forces.

Everything thus far has been conducted on the line of treating Porto Rico as a dependency, for the time being, at least. To this extent, the government has adopted a distinctly colonial policy, but there is no decision of the United States courts which can be appealed to as sustaining absolutely the present decision of the administration and congress. The decisions of the courts affecting territories do not have a clear or direct application to the existing status of affairs. Much respect is expressed for the opinion of Charles E. Magoon, law officer of the division of insular affairs, on the legal status of the territory and inhabitants of the islands recently acquired by the United States from Spain. According to Mr. Magoon, the products of Porto Rico have no more right of entry into the United States than have its inhabitants, who are classed by him as aliens, and as having no more standing than the subjects of China, until their several rights and political status are determined by congress. He says, however, that they are entitled to "call upon this government to protect them in their rights, property and person," and that they "owe allegiance to the sovereignty, and obedience to the laws of this country." Here are some very nice legal points that need clearing from their ambiguity.

TARIFF ON FIGURED COTTON CLOTH.

This subject was discussed at considerable length by us in our January issue, affecting a certain line of imports of cotton fabrics which were classified by the custom house officials under a paragraph of the tariff act of 1897, imposing one to two cents additional duty per square yard, where other than ordinary warp and filling threads have been introduced in the process of weaving to form a figure.

Our views concerning the application of this provision of the tariff were so thoroughly gone into at that time that we have nothing particularly to add. Since then, however, the Board of General Appraisers have rendered another decision affecting the classification of certain imports of cotton cloth, in which ornamental figures appear. This decision of the Board of General Appraisers conveys the impression that it conflicts with the one that it rendered last September. This is only so apparently, because the particular fabrics upon which the two decisions were rendered differ essentially in their features as containing other than ordinary warp and filling threads. We have seen some of the goods that were the subjects of these two decisions, and fully agree with the Board that the two importations do not necessarily come under the same classification.

We do not see how it is possible to so construe the meaning of the law, or define its application, as to fit all cases of importations of cotton fabrics with fancy figures, and we doubt if any decision of the courts would make it more clear. The appraising officers at the port of New York have interpreted the latest decision of the Board of General Appraisers to the effect that cotton cloth shall not be classified under the provisions of the law requiring extra duties, which contains threads of whatever size, that have been introduced into the process of weaving to form either cords or ribs, which run parallel with the ordinary warp and filling threads of the cloth, or any that contain figure threads that are floated free upon the back of the cloth between the figures formed by such threads, unless the floats are more than one-eighth of an

inch in length. What we desire to call particular attention to is the last phrase, which is certainly an arbitrary one and easily styled as a very narrow one. There is nothing in the law that would justify any such close measurement as one-eighth of an inch in length, or any other measurement, whatever.

A slight idea of these floating threads may be obtained by turning to page 449, this issue, where an illustration is given of the back of a piece of cloth, showing threads that appear at intervals upon the face, in the form of dots.

This action on the part of the local appraisers at the New York custom house has brought out a second protest on the part of the Merchants' Association, New York, to the secretary of the treasury, as being unjust and absurd, and inapplicable.

TEXTILE SCHOOLS.

The trustees of the Lowell Textile School have before the Massachusetts legislature a bill asking for $16,000, to be applied to the purposes of that school, to be paid when an additional sum of $6000 has been received by the trustees from the city of Lowell or from some other source. The bill also asks a further sum of $50,000, to be applied to the erection of a building for the accommodation of the school, conditionally, that a lot of land shall be given for the location of the building. It is understood that a suitable site, valued at $15,000 to $20,000, for the school, has been offered by one of its friends. At present writing, the views of the legislative committees which will pass upon this bill are not sufficiently well known, as to the favor in which that part of the bill stands relating to the appropriation of money for the erection of the school building. Those acquainted with the present accommodations of the school readily see the necessity of a building especially arranged for a school of this kind, and we trust that the legislature will take this view of it sufficiently to vote the sum called for. This school is the pioneer textile school in New England, centrally located, within reach of the manufacturing population of New England. Its geographical situation and accessibility could not be surpassed. The school is being conducted on a most economical system consistent with proper efficiency. As noted, the bill calls for only $16,000 from the state and $6000 from the city of Lowell for the maintenance of the school for the current year. This is somewhat less than was considered necessary a year ago. We do not believe, however, in any parsimonious plan of economy for the expenditure of money or for its appropriation, inconsistent with the demands for a high grade of instruction, which cannot be expected unless the best available talent is employed.

The textile school at Fall River is materializing, apparently, in good shape, by the assured promise of a building, to be paid for from the state and city appropriations. As the building will not cost over $32,000, there will be $18,000 left in the hands of the trustees for other purposes. In this respect, Fall River is following very much the plans of New Bedford.

—Much has appeared in the local press about Boston of the visit of a delegation of Japanese to the several textile manufacturing centres of New England, for the purpose of investigating our system of manufacturing, and especially the employment and utility of American machinery as compared with that in use in European countries. Our textile machine shops and factories have been visited by this delegation, with a very probable result that much American machinery will be purchased for equipping the cotton mills of Japan. We have seen members of this delegation, who have expressed themselves highly pleased with American machinery, both for its strength and many convenient devices. Its stability is better than they expected to find or were led to believe was the case. The American loom, especially, is spoken of as being far superior to anything

of the kind made in European shops. So far as we can learn, the American prices will not materially interfere with the use in Japanese mills of American machinery, with possibly one or two exceptions.

—According to the last annual report of the Boston Mutual Manufacturers' Fire Insurance Company, it appears that a very large majority of fires occur during the day-time, though the losses per fire are much greater when they take place at night. Most of the causes of fires for 1899 were due to accidents, or defects, in the cotton picking department, though it is a subject of remark that a large portion of these were due to unknown causes. The automatic sprinkler is referred to in the report as being the most effective auxiliary ever invented, because it works at night as well as by day. Notwithstanding the loss per fire was much greater during the night than during the day, the aggregate losses were greater on those occurring during the day than during the night.

—Ellison & Company's annual report of the cotton trade for the year 1899, which has come to hand since our February issue, shows a remarkable degree of prosperity for that year in the cotton spinning districts of England, as exemplified in the returns of the cotton companies located at Oldham. A prosperity affecting the cotton industry of England, equal to that which prevailed during last year, is not to be found until we go back to the early seventies, when spinning mills were making 20 to 30 per cent. on their investments. Last year was the most profitable one in cotton manufacturing in England since 1890. Weavers did nearly as well as spinners. The average consumption of cotton in Great Britain, per week, during 1899, in bales of uniform weight of 500 pounds, was 67,670 000, against 66,750,000 in 1898, and 60,830,000 as the average for the five years of 1888-92.

—The Board of Government of the New England Cotton Manufacturers' Association have elected D. M. Thompson, Providence, R. I., to fill the office of president, rendered vacant by the death of Frederick E. Clarke. A better selection could not have been made. The new president has a large personal acquaintance among manufacturers, derived largely from his practice in mill engineering, which was preceded by a thorough training in connection with the manufacture of cotton goods. Mr. Thompson is now occupying the position of general superintendent of the mills of B. B. & R. Knight, who are the largest manufacturers, bleachers and finishers of cotton goods in the world, having seventeen manufacturing plants, with nearly half a million spindles.

—It was our intention to speak at this time at considerable length, concerning the proposed reciprocity treaty between the United States and France, but we find that our space is too limited for anything of this kind. The prospects now favor the postponement of congressional consideration of this subject for some time to come, because of its unpopularity and injustice to an important industry of this country, and particularly to a valuable branch of it, that is assuming a prominent status, due to the protection which is afforded it by the present tariff law. We refer especially to the manufacture of a high grade of full fashioned knit goods. It looks to us as an almost inexcusable blunder on the part of the representatives of the United States to have entertained a proposition for so large a reduction as twenty per cent. on the present rates of duty on hosiery and knit goods, in order to effect a treaty of reciprocity with France, which, if carried into execution, would practically destroy, because of foreign competition, a new line of American manufacture, which requires expensive machinery and skilled labor for its production. If this treaty, with twenty per cent. reduction in the rates of duty, were carried out, a very considerable amount of invested capital would become utterly useless, or would have to be devoted to some other purpose, at a considerable loss during the transition.

(Special to the Textile World.)

Cotton Textile Industry in Mexico.

For centuries before the conquest of Mexico, cotton spinning and weaving were understood and practised by the natives, and cotton cloth, both white and dyed, was the usual dress of the people.

Under the colonial regime, the policy observed by Spain towards Mexico, as towards her other dependencies, was to check industrial enterprises in those directions in which it might interfere with trade or industries of the mother country. It was not until after independence was declared that the first step for improvement was taken by the Mexican legislature (in the year 1830) by establishing a bank with a capital of $1,000,000 for the purpose of supplying machinery at cost price to persons wishing to start factories, and of advancing money for their working expenses at 5% interest.

The first factory was started in the year 1834, near Puebla, and 10 years later there were 50 factories, mostly small ones, at work throughout the country, producing annually about 500,000 pieces of cloth and 6,000,000 pounds of yarn. In the fiscal year, July 1898 to June 30, 1899, however, there existed in Mexico 125 spinning and weaving mills with 491,443 spindles and 14,759 looms giving employment to 23,731 people.

These works consumed in the same year 17,816,613 pounds of cotton and from this raw material they manufactured 11,853,842 pounds of all kinds of textiles and 2,129,007 pounds of yarn. The total value of the cotton textiles manufactured in the last fiscal year amounted to about $7,481,649, while the total annual value of the cotton crop of Mexico is approximately $11,000,000.

In the early days of cotton manufacturing in Mexico, the only motive power employed was water, if we except a very few small mills, which were worked by horses or mules; but as the industry grew in importance, and the capacity of the leading mills was gradually increased, it was found necessary to supplement the water power by steam. In the year 1898 there were 45 mills, averaging 133 horse power each, which were moved exclusively by water, while those moved by steam and water combined numbered 34 with an average of 160 horse power each.

The great advance made of recent years in the transmission of power to considerable distance by means of electricity makes it now possible to utilize falls of water, as motive power for industrial purposes, in places where it would be impracticable from an economical standpoint to erect factories, and there is no reason, therefore, to anticipate that, for the present at any rate, the development of industrial enterprise will be in any way checked by the want of cheap motive power.

The raw cotton consumed in Mexico is chiefly imported from the United States, as the country itself cannot raise more than one-third of its demand. The best cotton, but a limited quantity, is grown in the State of Tamaulipas, more comes from the States of Nuevo Leon and Coahuila.

Duties are high, wages very low. Card room hands average in American currency 25 cents per day, spinning hands 20 cents per day, weavers earn 12.5 cents per piece of 29.5 yards. Each weaver handles two looms, and is expected to turn out two pieces a day on each loom; hence his wages practically represent 50 cents per day. The piece of cotton cloth as manufactured in Mexico is usually estimated to contain on an average, about 24 square yards of material, and the width averages from 29-30 inches. By far the greater part of the plain woven cloth manufactured is of heavy material and unbleached, and is used for clothing by the laboring classes, as well as for ordinary domestic purposes. The texture is generally coarse, under 33 threads of weft and warp to the one-half centimetre

square. Among the poorer classes the principal demand is for printed cotton of cheap quality and few colors. Very little has as yet been done in the manufacture of fancy goods, owing mainly to the necessity for employing a larger proportion of skilled labor for such articles and to the considerable increase in cost which this would entail.

Cheap colored handkerchiefs and fancy drills are produced to some extent and in some of the best equipped mills some satin, flannel, and other similar material have been recently turned out, but no attempt so far has even been made to manufacture the heavier class of goods, such as moleskin cords or velveteens, which would seem to be suitable for the climate of the central plateau, especially in winter. For those articles Mexico entirely depends upon importation from abroad, and owing to the steadily increasing efforts on the part of the manufacturers of the United States to secure foreign markets for their products, it is important that they should not overlook a market which lies at their very doors.

It is also gratifying to be able to state that the superiority of American textile machinery is fully recognized in Mexico, and that almost all the new machinery installed in that country is of American make.

With regard to this, a local Mexican paper has the following to say:—

"Improved machinery of all kinds has been one of the principal imports of Mexico for several years, and there is every reason to believe that the growth in this line will continue for many years to come. It will be years before manufactures will be produced to any extent inside the Republic; but every day the extension of railroads, and the successful demonstration that modern methods pay, is increasing the demand for American manufactures; and when the territory already easily accessible is canvassed by American exporters with one-half the care that is given their home trade, the result will be astonishing. Within fifteen minutes' walk of the centre of the city of Mexico, one can see in use the same style of wooden plows that have been in use in Mexico since Cortez's time, and hundreds of mines throughout Mexico are being worked with the most primitive kinds of machinery. Mexico's demand for modern manufactures will continue for years to increase much faster than it is possible for home industries to supply them. Every year the things that have heretofore been luxuries to thousands of people are becoming every day necessities. It is this country, rich in every natural resource, now in the course of a vigorous and healthy development, that lies invitingly before the American manufacturer. It is not a field whose business can be had simply for the asking. The established trade of European nations must in many cases be met in competition, but the superiority of American goods and proximity of the source of the supply are strong arguments. Here is a hint which American manufacturers should not be slow in taking. There is no reason why they should not secure for themselves, and at good prices the bulk of the Mexican trade."

The most prominent textile works in Mexico are: The Compania Industrial de Orizaba, which owns the factories of Rio Blanco, Cerritos and San Lorenzo, with 1,738 looms, 61,092 spindles and six printing machines, and employ water power. The Compania Industrial Manufacturera, whose properties consist of the factories of Hercules, San Antonio, and La Purisima, having 1,179 looms, 43,656 spindles and three printing machines, and who use steam and water power, and the Compania Industrial de San Antonio Abad that owns the mills of San Antonio Abad, Barron, La Colmena, and Miraflores, which are worked by steam and water power.

The following is a list of reliable firms in Mexico City, who are importers of textiles and textile machinery.

Ailhaud Hermanos, Esquina 2a Monterilla y Portal Diputacion.
Caire Aubert y Cia., la Monterilla, 8.
B. Coblentz, 11 Palma.

J. Dachary y Cia., Lerdo, 2.
L. Faudon y Cia., 1 de la Monterilla.
M. Frank y Cia., Portal de la Diputacion.
Jauffred y Andiffred, Primera Calle de Plateros, 1.
D. Olivier y Cia., S. C., Correo Apartado, 212.
Prado y Goday, Sucs., Calle del Refugio, 12.
A. Reynaud y Cia., Esquina Portal de las Flores.
San Ildefonso, Sociedad Anonima, Capuchinas, 13.
Manuel Sevilla y Roa, la Santo Domingo, 4 y 5.
Signoret, Honnorat y Cia., Calles 2a Monterilla y Capuchinas.
Simon Weil, Esquina la Plateros.

TEXTILE MACHINERY.

Pedro Pelaez, Capuchinas, 4.
Grailie, Ollivier y Cia. (owners of cotton mills), Portal de la Diputacion.
I. Silver y Heregue, Sucs., San Bernardo, 2¼.
John M. Summer & Co., Mexico City.
San Ildefonso, Sociedad Anonima, Capuchinas, 13.

Automatic Machinery vs. Labor.

C. L. H.

The talk which Northern and Southern manufacturers so lavishly indulged in a year or more ago concerning the great advantages possessed by the South, as compared with the North, as a section in which to profitably establish new cotton mills has almost completely subsided. This moribund condition of the controversy has no doubt been brought about by the phenomenal activity that now prevails in the cotton manufacturing industry in both sections of the country. Their energies are now being more profitably devoted to getting out the largest possible production from their mills in the shortest possible time; to their contracts for future delivery and the price of cotton rather than on the difference in cost of production in the two sections.

Cotton-mill building has been stimulated to a remarkable activity in the South as an outcome of this very prosperous condition, and new mills are reported almost every day as being projected or erected in the great centres of manufacturing in North and South Carolina and Georgia, and also in other parts of the South. Even in the North a lively interest is being shown in the erection of new mills, and in New England the additions to her number of spindles bids fair to be the largest in several years. The relative cost of production does not seemingly enter into the calculations of these projectors, or if it does, no great fear of Southern competition seems to deter them from placing their money in Northern mills. The good profits now being realized on cotton goods may in a measure account for this, but at the same time it looks as if they had an abiding faith that the great cotton industry of the North had still long years of life and prosperity before it. Besides this, the men who are putting their money into these new Northern mills are shrewd, keen business men, with an intimate knowledge of the cotton industry and a very careful regard for the future of their investments. It is also barely possible that they may feel that too pessimistic views have been entertained by too many as regards the future of cotton manufacturing in the North.

That the South has certain advantages over the North in manufacturing cotton goods in low counts has been generally conceded, but this concession has not been extended to the finer counts, where the larger profits are realized. The material factors that conduce to this advantage is the cheapness of labor and the long hours worked. These, however, may not be so great as it seems, as the correct measure of this cost depends on the amount and quality of production rather than on the number of hours run or the cheapness of the labor employed. Still this question of labor is the argument that has had the greatest weight in influencing Northern mill men to locate extensions of their plants in the South, as well as inducing capitalists to invest in mill enterprises there. Long hours and cheap labor are but transitory in their nature, and are subject to the many influences which tend to equalize labor conditions as well as the wages paid labor. There are two prominent factors in this equalization which will ultimately control it:

First, as the demand for factory labor increases in the South, wages will, as a matter of necessity, have to

be advanced nearer to a parity with those paid in Northern mills and a reduction in the hours of labor will naturally follow. At the rate factories are going up at the South, it cannot be but a very few years before that section will have to face the question of more pay and less hours. The Northern mills had to meet similar conditions years ago, and the demands of labor had to be finally conceded, although strenuously contested. That Southern mills are going to escape the trials and tribulations which have attended cotton manufacturing in every other part of the world is not thought at all probable by those conversant with the history of the industry.

Second, the part automatic machinery is destined to play in the equalization of the cost of labor. Automatic devices have been constantly multiplying, and their adoption means, of course, the displacement of a certain amount of labor. As a prominent instance of how this may affect labor, the Northrop loom may be taken as an illustration. In mills where it has been introduced weavers on plain goods are running twelve or more looms where they formerly run six or more of the common kind. What would be the effect on the weaving industry if the Northrop loom should be introduced into every mill in the country weaving plain goods? Practically a reduction of about fifty per cent. of the number of operatives employed; and it is not at all improbable that further improvements will be made in the mechanism of this loom whereby a still greater percentage of employees can be dispensed with. As the cost of weaving is about one-half the labor cost in producing a yard of cloth, it will readily be seen what the advent of the Northrop loom means to the cotton goods industry in its bearing upon labor.

The Northrop loom, however, is only one of a number of labor-saving devices that will have to be considered in the future in figuring on the labor cost of production. There is the rotary spinning ring, a recent invention, which it is claimed is capable of making 20,000 revolutions a minute, as compared to a maximum speed of 10,000 to 12,000 of those now in use. This would represent a gain of 66⅔ per cent. in production and consequently a corresponding reduction in labor cost.

Another important labor-saving device is the drawing-in machine, which was exhibited last summer in Boston, which practically dispensed with a large number of drawing-in girls.

Invention in textile machinery is now practically all on the line of quickening speed or on labor-saving devices intended to bring it nearer to that stage of perfection which will permit it to be run automatically, thus lessening the cost of production by dispensing with labor. Every labor-saving invention narrows the existing labor conditions between the North and the South and tends more and more to equalize them. In the two most important departments of a cotton mill—the weaving and the spinning—the saving made in one case, as we have stated, is fifty per cent., and in the other 66⅔ per cent. This saving is not problematical, either,—certainly not in the case of the Northrop loom, and the claim for the spinning ring is made on the highest authority.

What invention may have in store for the future in the way of automatic textile machinery it is not safe to prophesy. It is safe to predict that it is not going to shut up shop, and will continue to cheapen cost of production through labor-saving devices. Perhaps the nineteenth century may close its record of remarkable invention in textile machinery by surprising the world with a perfectly automatic loom; i. e., a loom that will take its filling from a continuous bobbin, save shuttles, pickers, and the other paraphernalia attending the picking arrangements of the present loom; a loom that will keep on weaving day and night simply with a renewal of the warp and weft as they run out, and the removal of the cloth from the

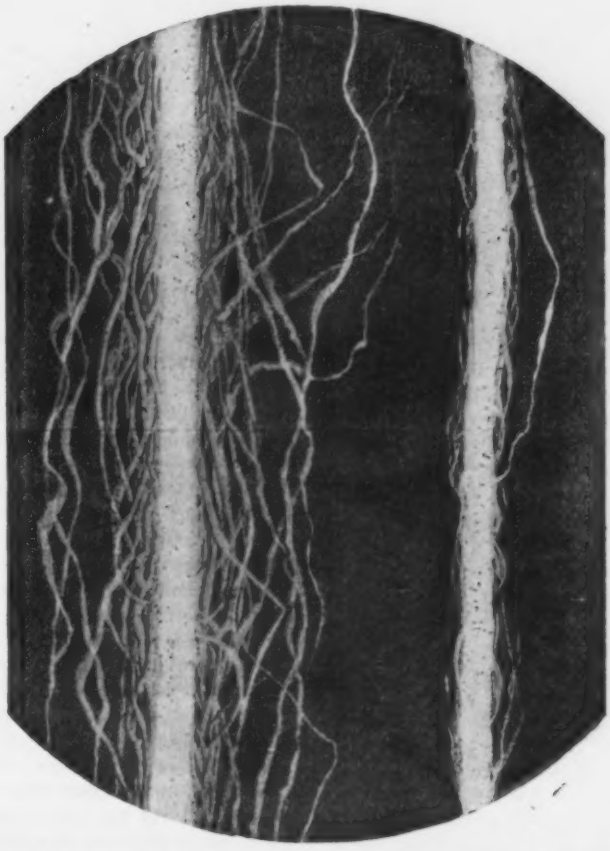
beam, and an occasional oiling and cleaning. If the closing year of the nineteenth century cannot give us this loom, it can leave it as a legacy to the twentieth century to experiment with.

Humidifying in Knitting Rooms.

The advantages of proper regulation of moisture in spinning rooms is thoroughly recognized and almost all modern spinning rooms are equipped with apparatus for this purpose. In conversation with a Cohoes knitting manufacturer recently, he mentioned the fact that he had equipped his new cotton yarn spinning plant with Humidfiyers and as there happened to be an extra head, he had it put in his knitting room. To his great surprise and gratification, the results were, as he expressed it, "really remarkable." It made the yarn run much better in the knitting and took all the kinkness out of it. The operatives were delighted with the way in which the work ran.

The experience of this knitting manufacturer coincides with other similar instances where the American Moistening Co.'s system has been adopted. It may not be generally appreciated what an effect this system has upon the spinning of yarn. The illustrations show the difference between the yarn spun in the same mill on the same frame before

WITHOUT THE SYSTEM. WITH THE SYSTEM.



COTTON YARNS SPUN IN THE SAME MILL ON THE SAME FRAME BEFORE HUMIDIFIERS WERE INTRODUCED, AND AFTER.

Humidifyers were introduced and after, the left-hand view being the yarn spun before they were put in. This difference may not be apparent to the naked eye, but its good effect upon subsequent weaving or knitting operations is equally marked.

The Angora Goat.

(Continued from February.)

That our readers may have the testimony of those who have had valuable experience in the raising of Angora goats, we furnish several letters, as below, one from G. A. Hoerle, Ridgewood, N. J., who for a number of years was corresponding secretary of the American Mohair Grower's Association; one from H. T. Fuchs, Tiger Mill, Burnet Co., Texas; and one from Robert Dawson, Saxonville, Mass. All of these are capable of writing upon the subject authentically.

FROM G. A. HOERLE.

There can be no doubt, that for years to come, the pursuit of every branch of Angora raising will be continually on the increase, and for a long time remain one of the most lucrative branches of animal industry.

Until recently some doubt still existed in the minds of many, as to the possibility of the American breeders' ability to compete with the Cape of Good Hope, or Turkey, but, of late, every vestige of doubt has been removed, and sufficient proof exists, that the country can excel the Cape, and I, myself, sincerely believe, that with the use of judiciously spent money, some brain effort and resolute energy, we can hold our own also against Asia Minor itself, even should that country become inundated by countless energetic Germans.

As the Transvaal war will most likely give a severe blow to the Angora goat husbandry of the Cape Colony, it is evident, that our chances will increase at the same ratio, as the number of Angoras at the Cape is declining. As far as the importation of breeding stock from the Cape is concerned. The new export duty of $500 for each Angora goat, male or female, has practically put a Chinese wall around that country.

In the United States, there are nearly three hundred millions of acres of land, which are not fit for anything else to live on, but goats; but they would be a paradise for these animals, and if they are of sufficient elevation (which according to location should vary from five hundred feet to five or six thousand—the warmer the climate, the higher a location is required) are just the very desideratum for Angoras.

Some of our western railroads own immense tracts of such land, and to them it would pay extremely well, if they would contribute liberally towards promoting this industry.

The various letters of inquiry which I receive usually have the following questions: "Would it be advisable for me to engage in raising Angora goats and where can I buy the best breeding stock, what does it cost, and will you please give me all the information you can, in regard to this industry?" Of course no mention is made by the party inquiring as to the amount of capital he means to invest, or of his age, his present occupation; or whether the animals are to be kept as a supernumerary on a farm; whether he intends to make them his sole source of income, or only wants them to be an addition to his present income, or perhaps wants the goats more for pleasure or ornament. Nor is there any mention made whether the Angoras are to be put on land he already owns or controls, or whether his circumstances permit him to engage in the new enterprise in no matter which state of the Union.

These are all points of extreme importance, if my answer shall be satisfactory, and if reliable advice or information is expected.

To persons owning or controlling land of the above description, my first question would be, how large is the tract, what character, where is it located? the next, how much money can

you invest? The farmer, who possesses suitable brush land on his farm, can commence operations with the least expenditure, a few hundred dollars, if necessary; and if he is in a locality where he can sell the meat of his surplus stock to the consumer direct, he can make a handsome thing of it.

The aversion some people have against the meat of the Angoras is all bosh. If I had to choose between well fattened Angora meat and the best South down mutton, I would take the former. It is as juicy, has a flavor somewhat like venison, and is not so disgustingly greasy as the latter.

Buck 9 lbs. fleece. Ewe 5½ lbs. fleece. Buck 6 lbs. fleece.

PURE ANGORA GOATS FROM ASIA MINOR, OWNED BY JOHN S. HARRIS, OAKLEY, IDAHO.

Next to the farmer comes the person who controls land in the neighborhood of a good reliable farmer willing to take charge of his stock. However, he has to start the new enterprise on a considerably larger scale, in order to be worth the trouble, and pay good attention to his stock. Twelve hundred to two thousand dollars may do him.

Both of the above mentioned people should begin with the best grades obtainable, and not invest in thoroughbreds until they have gained sufficient knowledge and experience, for these latter require considerably more attention and study, if their owner does not wish to land at the tailend of the husbandry.

The party who has several thousand dollars to invest, and prefers to remain in the northern or northeastern states, and possesses a liberal education, natural intelligence and application, and besides can devote a good deal of his time to his stock, should by all means start with the best thoroughbred flock his means would allow him to buy, as then it would be his young bucks, as well as his surplus females, which would bring him the most money. John S. Harris of Oakley, Idaho, is disposing of his bucks and surplus does for from $50 to $75 a piece.

The lucky man, who has several tens of thousands to invest of course can choose at his pleasure, though even he has better chances if he goes to such parts of our country, where conditions are not only most favorable to his stock, but also where land is cheapest. With such means he should buy or lease for a long term of years, the land which he needs, fence its outer line well, with dog and wolf-proof fences, and then subdivide into smaller pastures, turning his animals loose, keeping only a general control over them. I would also advise him

to start both with the best grades and the very choicest thoroughbreds he can find. Only if his acres count by the fifty or hundred thousand should he begin with the grading up of low grade Angoras or common goats, which only pay on the very largest scale.

The latter system was successfully pursued by Col. Black, a Texas breeder, who bought his first Angoras in the year 1884, twelve animals, at over $60 each, with a view to grade up a flock of common, which he had kept for the preceding ten years for the purpose of feeding his Mexican ranchhands. In 1897 he made his first shipment of thus graded Angora does to the State of Iowa, where up to 1895 even less than a total of 100 Angoras had been kept by a very few farmers, and Col. Black alone has since then shipped over 10,000 Angora goats to that State, at well-paying prices.

Of late many bright energetic men of means have started in this business, and I am convinced that the old style breeder will give way to the man of the 20th century, full of energy, superior intelligence and liberal views. The latter will own the best paying flocks and he will pay liberal prices for choice breeding stock. The cape breeders have given us in this regard a most splendid example; money was no object to them, when quality was required. They coolly paid at their auctions up to $2250 for a single imported Angora buck and up to over $1000 for does, and the bucks of the J. B. Evans' importation of 1880 sold for an average of $960—and the does for $385. Of the bucks only two animals brought below $700, but they were sick the day of the sale and in very bad looking shape and yet they brought $200 and $300, respectively, otherwise the average price would have been over $1000. However, the thrifty Cape breeders did not throw away their money foolishly, for the entire flourishing mohair interests of South Africa are due to the liberal prices paid for good breeding stock.

Whoever decides for thoroughbreds for his venture would no doubt do best by joining a new importation which is now being agitated, and which will bring animals to this country superior to anything ever brought to either the Cape or the United States.

Col. Black is at work at a book giving detailed information about the selection of suitable pasture lands, and breeding stock, as well as points about the successful management of Angora goats "from their cradles to their graves"

FROM H. T. FUCHS.

I am often asked if sheep husbandry will pay as well as the Angora goat business. In reply I would say that real good sheep on a real good range will probably pay as well as Angora goats, that is, if the sheep are well attended to. The main reason why I like the Angora goats better is that they can be kept on a hilly or rocky range, where other stock would starve, and that they will kill out the undergrowth of brush and weeds, enabling the range to produce grass for cattle and horses and sheep.

The Angora goats appear to stand the coldest climate in the United States all right, at least my correspondents have sent me very favorable reports from Minnesota, Michigan, Wisconsin, Nebraska, Oregon, South Dakota, Pennsylvania, Kansas, etc.

Here in the Southern States we always shear twice a year, in September and in March. If we do not shear twice, the goats suffer too much in warm weather; and they appear to be livelier while their fine, silky hair is kept short. I have sometimes lost some of my finest 6 months' old kids by their getting wound up in the thorn bushes with their long soft hair before shearing in the fall; and even the mature goats get wound up in the brush sometimes.

Most people are amazed at the beautiful sight, when they see a herd of Angoras with their white, wavy, silky fleeces. There is nothing more

attractive than a flock of these goats before shearing. I have seen people watching them for hours with great pleasure. The kids especially are very amusing in their peculiar way of playing, and even the grown goats love to play when the weather begins to get cooler in the fall and winter.

Here in Texas we seldom have much snow to remain on the ground longer than one or two days. In such cases I have generally chopped down a few of the evergreen live oak trees for my goats. Sometimes we have sleet hanging on bushes and trees, which is much worse for the animals than snow. But most farmers provide themselves with some feed, such as sugarcane, hay, oats, rye or wheat straw, upon which their stock can be fed for two or three days in the winter. In cutting down a live-oak tree, the jar caused by the falling of the tree, generally makes the ice fly off the leaves and twigs. The cattle will also flock around the man who chops down trees, in case of snow and sleet, but these Angoras are generally too quick for them and get away with most of the leaves.

Another thing which stands to the credit of goats is their great love for home. They will come home about sundown, or a little earlier, very regularly and need not be herded, unless they are disturbed by wolves or dogs on their way home. In that case they are very apt to escape to the highest hill tops, and to the roughest and rockiest wilderness that they can find in their pasture. If an Angora goat can get to such rough places before it is caught, it will generally fight very bravely for its life, standing on a high cliff, or against a bluff with its back facing its enemy.

In kidding time keep all does, that will soon bring kids, in a separate, small pasture where they can be driven to a shed in case of a cold rain; but in dry weather you may leave them out all night, that is if the pasture is safe against hogs, dogs and wolves, or other animals that might catch young kids.

KIDS AND YEARLINGS, OFFSPRINGS OF THE J. S. HARRIS GOATS CROSSED UPON THE FLOCK OF GEO. W. BAYLOR, MONTELL, TEXAS.

[See preceding illustration.]

The bucks, here in the South, are allowed to run with the does during the latter part of October, so that the kids will come in the latter part of March, after shearing has been completed.

Mohair is in most cases shipped to New York, where it brings fair prices from 25 to 40 cents per pound, and is generally sold within a few days after reaching the market.

I have compared my mohair several

times with Turkish mohair and in each case the Turkish mohair was not near as silky and glossy as that from my goats.

FROM ROBERT DAWSON.

I have become thoroughly convinced of the practicability of raising Angora goats and that it will be a coming industry here in New England and will be of great benefit to our farmers.

Last March I took a lease of a large farm for ten years, and since then I have had a number of men putting in drain pipe to drain some of the land, and putting in posts to wire fence the most of it. The farm contains about two hundred and fifty acres, and buildings that will accommodate fifty head of cattle and five hundred sheep or goats.

Since leasing the farms and purchasing some goats Wm. Butler, treasurer of the Saxonville Mills, has joined me in the enterprise, not so much, he says with the expectation of making money, but if he can assist in making "two blades of grass grow where one grew before," and is the means of assisting in starting a new industry here in New England, he will be perfectly happy.

We are just putting in foundations for a grist mill to grind the rye, corn and other grains, grown on the farm, utilizing a water power on the premises. The building will be about 60 by 25 feet, two stories, and a part of it three in order to accommodate a round silo 20 by 30 feet high. We are also putting in foundations for a goat shed in connection with the mill. It will be about 130 by 30 feet. We are in hopes of getting them up this winter, in order to be ready for the increase in our flock, which we want to bring up to one thousand next year, and we are in hopes to double the number by nineteen hundred and one.

In regard to the care of the goats, I find the pastures want to be thoroughly wire fenced. Stone walls will not do. In cold storms have them come home to shelter, otherwise let them alone.

I find them very free from disease, and very easily cared for. They prefer sprout land to pastures, and delight in eating sprouts from scrub oak, hemlock, cedar, juniper, and all kinds of berry bushes; in fact, they will leave the best of grass for them. This will give us a chance to pasture young cattle with them, which we propose to do.

To put up the wire fence properly, I am using chestnut posts eight feet long and five inches in diameter at the small end, placing a post every rod; it will cost us completed, one dollar per rod. There are many farmers in New England who can construct the same fence much cheaper, say 85 cents, by doing the work themselves.

In winter, while I propose to house the goats, yet on clear days, no matter how cold it is, they will have the fields to run in, adjoining the sheds, for I find that they love freedom, and on one occasion this summer, they demonstrated this characteristic very forcibly. During August, I had a small piece of mowing land which I fenced in temporarily and put on it twelve goats to have them feed it down before plowing. They were perfectly contented for a day or two, then they began to get uneasy, and got out, and it was almost impossible to keep them in. It was some time before my man could discover how they got out. It seems in putting up the fence, the wires were not drawn tight. The goats discovered that by lying down and turning on their backs they could get their heads under the wire, then by bringing their front feet forward under the wire, they could raise it high enough to push their bodies through. The moment one got out, the others would follow at the same place.

Now I could not believe this, until I saw them do it myself. My man then got small stakes and drove them into the ground between the posts, and tied the wires to them. The goats were turned in once more and they wandered about for a little while then got together about thirty feet

from the fence, and all made a charge for it, but failed to get through, and they made a number of charges with the same result, and were finally obliged to give it up. They would not, however, remain contented, and in a day or two I was obliged to have them put back into the pastures. They do love to roam over our hill pastures.

In regard to care and feeding, I intend to feed during the winter, largely

PURE ANGORA GOAT, MALE YEARLING WITH 5 MOS. FLEECE, OWNED BY J. S. HARRIS, OAKLEY, IDAHO.

on corn, ensilage, rye and other grains. With plenty of feed and good care during the winter and careful breeding, I am confident I can get as fine a fibre and as long hair as can be produced in this country, and hope to be able to shear from four to six pounds from each goat.

It is estimated that about 24,000,000 pounds of mohair are produced in the world, 10,000,000 being the product of Turkey, 13,000,000 the product of South Africa, and 1,000,000 the product of other parts of the world, the United States furnishing 800,000 pounds. The best mohair grown in the United States comes from the Pacific coast, Oregon, particularly, and the poorest from Arizona.

The grading of mohair differs with different handlers of it, for trade purposes. Some dealers have it graded as follows, in the order of its value: choice (pure blood); superior (full blood); fair (high grade); ordinary (fourth cross); inferior (third cross); trash, hair (first and second cross).

The most common method now practiced for grading, is to first classify it into three great divisions: (1) combing; (2) carding; (3) coarse. These again are subdivided into the following grades:

XX combing, or very finest, six inches and above in length.

No. 1 combing, or 2nd finest, six inches and above in length.

No. 2 combing, or 3rd finest, six inches and above in length.

Braid combing, 4th, or coarse hair, six inches and above.

Fine, or No. 1, medium stapled, five to six inches.

Medium, or No. 2, medium stapled, five to six inches.

Carding No. 1 and Kid, less than five inches.

Carding No. 2, less than five inches.

Blanket, all combing of a low, medium grade.

Carpet, next lower quality.

Common hair, white and gray.

Burry and seedy.

Black fleeces.

Locks, Britch and Manes.

The manufacturer makes from sixteen to twenty sorts, according to the kind of yarn and goods he is producing, and each mill has its own special standard and nomenclature. The value of combing hair increases with every inch of length, other factors being equal.

The fleeces should be kept separately, and each one carefully rolled up with the pelt folded out, so as to keep it intact. One hundred and seventy five pounds of mohair is sufficient to put into any one bag. Only square bales should contain a larger quantity. This is for better transportation to the market.

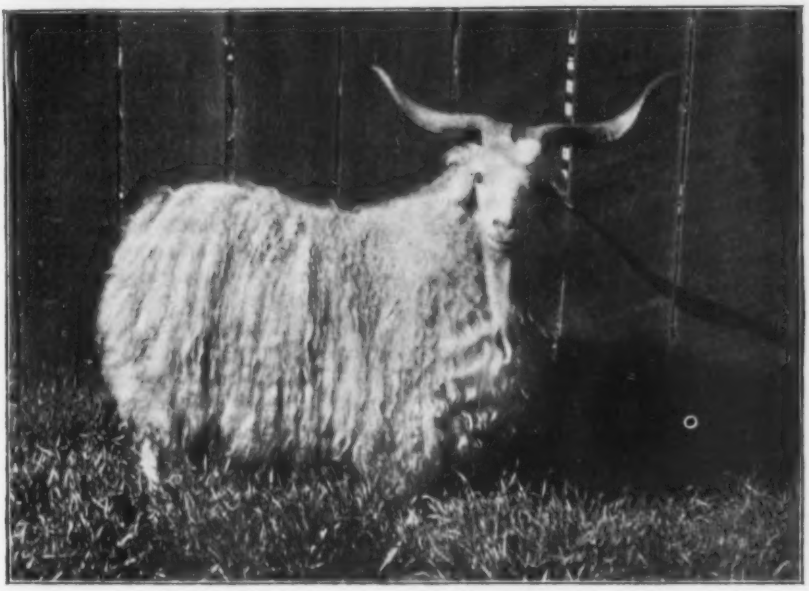
In the handling of mohair, in preparation for the market, beginning with the farmer, there ought to be some regular, understood methods for shearing. For instance, the fleece should be kept unbroken and intact, and not cut off in bits and be mixed up with coarse, black and locks, and all kinds indiscriminately packed together, as in Mexico. The shearer need not tie up the fleece, but roll it up, as in Turkey, and put it immediately into a bag, when shorn. The black fleeces, burry, coarse and common hair ought to be kept separately, and it is well to keep the kid hair by itself. All this saves time, labor, twine and money to the ranchman, and adds to the value of the mohair in the market. It also saves time and delay in sorting and selling, and enables the merchants, oftentimes, to sell the hair in the original package, and avoid some loss in weight and incidental handling. As a rule, most of the domestic mohair needs to be graded, to prepare it for the market, and this is done by the merchant who sells it to the manufacturer. It is almost pure guess work to determine the value of mohair ungraded in the original package.

The average fleece of pure-bred goats is from four to six pounds, but frequently eight and ten pounds have been obtained from choice, well kept animals. Shearing must be done as soon in the spring as the hair commences to shed. If left longer the oil in the hair goes into the body of the animal, and the hair loses its life, weight and lustre. In countries subject to cold, snow and sleet storms, it is not safe to be without sheds during shearing and kidding season.

Mr. C. P. Bailey says: "Half breed goats scarcely shear enough to pay for shearing; three-quarters bred goats shear one to one and a half pounds; seven-eighth bred goats shear two to three pounds; fifteen-sixteenths bred goats shear three to five pounds. The fourth cross, or fifteen-sixteenths, is the lowest grade that should be kept exclusively for mohair."

Wm. R. Payne, of Wm. R. Payne & Company, well known merchants in mohair and Angora skins, New York, to whom we are indebted for much in this article relating to the commercial side of the subject, writes, that the necessity of fresh, full blooded breeding stock is very apparent, and the absolute need of growing hair from six inches and upward in length cannot be too strongly emphasized. Mr. Payne expresses himself that there is little use of investing money in the Angora goat business, while the industry "is so handicapped for the want of sound, strong, full blooded, carefully selected Angora bucks. This will obtain until the leading breeders of

this country are willing to put aside for a time, at least, their personal and selfish interests and unite to form an association, subscribe capital, secure the animals from Turkey, through the government, or without its aid, start a registry farm, under proper, intelligent management, selling the increase judiciously, until a pretty full distribution has been made of good blood, and so build up the product on a new and healthy foundation. That fresh



ANGORA BUCK PASHA.

Imported from South Africa in September, 1893, by C. P. Bailey of San Jose, Cal., and still owned by him. Pasha had about 12 pounds of one year's growth when this picture was taken, February 5, 1898. His sire was "Old Sam," who at nine years old had taken more first premiums than any other goat in South Africa. "Old Sam" had a fleece of one year's growth on exhibition at the Chicago World's Fair that weighed 15 pounds and 3 ounces.

Turkish bucks may be obtained by a tactful procedure, seems to admit of no question, but until there is an evident united willingness on the part of breeders and mohair growers to act in concert and put out some money, it is useless to make suggestions or reveal methods by which this much desired result can be accomplished."

In determining the value of mohair, there are four cardinal points that should be observed, the equalization of which is necessary to the most perfect stock of highest value, and are as follows:

1st. Quality or grade, or relative fineness of fibre.

2d. Staple, or length of fibre.

3d. Lustre, or silky brightness.

4th. Condition, or cleanness and freedom from natural oil, dust, or extraneous matter.

Manifestly, therefore, a fleece of mohair that would be of the very finest fibre, longest staple, brightest lustre, and cleanest condition, is the most valuable, and forms the standard by which all other qualities and values are fixed.

As mohair is chiefly used in the manufacture of "worsted" yarns and has to be combed, the proportion of short, woolly and kempy undergrowth, and of relatively short fibres of pure mohair has to be considered. This is called "noilage." When the mohair at the mill has been sorted, it is called "matchings."

Mohair is used in the manufacture of the following class of goods: Plushes, serges, dress goods, braids, poplins, camlets, shawls, brilliantines, listings, rugs, loop yarns, etc. Mohair shorts and low grades are used for carriage robes, horse blankets, etc. Mohair mixes best with soft medium wools, and it is thus used to make hosiery, velvets, delaines, gowns, braids, tassels, trimmings, coat linings, cloakings, bindings, fringes, etc. It is used also to give lustre to many other fabrics. The best mohair plushes are almost indestructible. They are now sought for by all the best railroads as the most durable of all seat coverings, an unconscious tribute to the remarkable quality of this fibre. Some have been in constant use on certain cars in this country for over twenty years, without wearing out. For staple goods, like plush, upholsteries and linings, there is, of course, a regular demand, more or less uniform for the grades suitable for this class of work, but the braid trade and dress goods demand is uncertain and variable. There is, however, a consumption more than equal to all the really good hair grown in this country, with a slow but steady increase as the population gains and wealth grows.

The very long coarse fibred hair off of old bucks and wethers, when of twelve inches length, is used for dolls' hair and for wigs and artificial gray hair, and is quite valuable at from 50 to 75 cents a pound.

There is quite an extensive trade in the skins of the Angora, both dry and dry salted. Some 10,000 to 15,000 are annually brought in from Turkey, and some few from the Cape of Good Hope. They are graded according to length of hair and fullness of fleece, and weight of skin. The price ranges from $1.50 for five pound skins, up to $3.50 each for ten-pound. Cape skins sell at 25 to 30 cents a pound, or about $1 to $1.50 each. Domestic skins are very uncertain in size and quality, and range from 35 cents for kid up to $2 each for large pelts.

Filing Catalogues.

We fancy there are comparatively few mill offices where a convenient system of filing catalogues is employed. Too often, if they escape the waste basket, they are tucked away in a corner to accumulate dust, and when wanted, no one ever knows where they are.

We find the card index system a very convenient method for filing catalogues, and, for that matter, for filing correspondence. It consists simply of a tray of index cards of uniform size. As the catalogues are received, they are numbered in the order of receipt from 1 upwards, and filed away in numerical order. The names of the firms from whom the catalogues are received are entered each on a card, and the number given to the catalogue is also entered. These cards are arranged alphabetically. Another card is devoted to the subject of the catalogue, let us say, for instance, "Knitting machinery," and on this card are entered the names and numbers of the catalogues devoted to this subject. Suppose we want to know if we have a catalogue of the Lamb Mfg. Co. on file. A glance at the card index will show whether there is a card for the Lamb Mfg. Co. If there is, its number will be given, and it is a matter of a moment's search to find that particular catalogue in the file, which is arranged numerically. They can be piled on a shelf, or better still, placed in file cases to contain a certain number in each case. If we are interested in the subject of "Knitting machinery," and want to look over the catalogues of all the different makes, we turn to the card of knitting machinery and there find what catalogues on that subject are in the office.

The same system of filing correspondence is in use and has been found far superior to the ordinary system of filing by name, for in the latter case if one forgets the name of the party, the letter is hopelessly lost in the files; but with this numerical

system, where both name and subject are filed, a letter can be immediately traced, and moreover, all the letters from any correspondent, together with copies of our reply covering an indefinite period of time, are grouped together under his original number, which he always keeps.

The outfit for either of these systems is extremely simple. There is a concern in Boston that makes a specialty of supplying the cards and trays and pasteboard file boxes adapted to the purpose, and we should be glad to refer any who are interested to them.

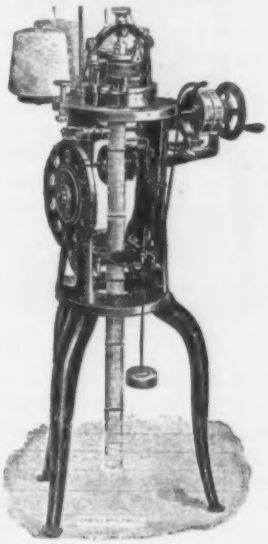
The Branson Knitting Machinery.

Everyone in the seamless hosiery trade is familiar with the Branson name, which has been identified with this branch of the business for many years. We think there may be some who are not perhaps aware of the great variety of machines that the Branson Machine Company build. Their idea has been to supply everything that could be called for in the way of machinery by the seamless hosiery manufacturer, and step by step they have added new types of improved machinery and perfected their old machines. This article gives a brief description of their line.

The hand machine is the simplest combination of mechanical devices to provide the result of knitting. It is adapted to the manufacture of hosiery in all sizes from 2¼ to 4¼ inches, varying by ¼ inch. They are chiefly used in public institutions and in factories where hand labor is cheap and fuel expensive and making power inaccessible. The price of this machine is extremely low and the machine is strong and well-built.

The semi-automatic machine built by the Branson Machine Company is similar in all respects to the hand machine above mentioned, but in addition is provided with a cam cylinder equipped with a device for automatically raising and pulling down the single needles when forming the heel and toe of the stocking. This picking device is suitable for use in all sizes and all gauges of machines. It simplifies the operation of knitting the heel and toe, doing away entirely with the hand manipulation of the single needles and is quicker and more accurate than the most expert operator. It also effects a saving in needles.

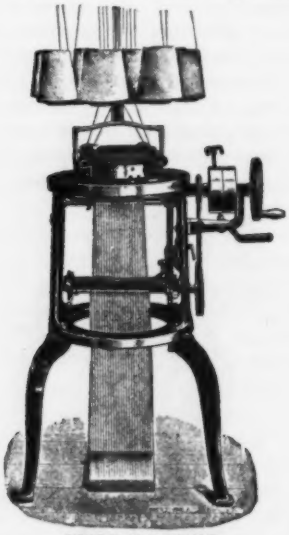
Power machines are provided with a tight and loose pulley so that they may be operated by power on the leg and foot portions of hosiery and the belt is automatically thrown onto the loose pulley when the proper length for the leg and foot has been knit.



RIBBER.

This is done by means of a device called the "rod stop-motion." The heel and toe may be made on this machine as on the hand machine, or this power machine may be equipped with a semi-automatic cam cylinder at a small additional cost and is suitable for use either with open top cylinder or automatic web holder attachment. This web holder device is attached to the cylinder and operates automatically to hold down the work on the needles at all times in above circular and heel and toe motions. It is made in all sizes and all gauges, and one operator may easily run two or three of these machines.

The ¾ automatic machine is the next step upwards. It is of simple and durable mechanism, and thousands of these machines are in use in the United States and other countries. A few hand operations are required in making a stocking complete with heel and toe. This machine is

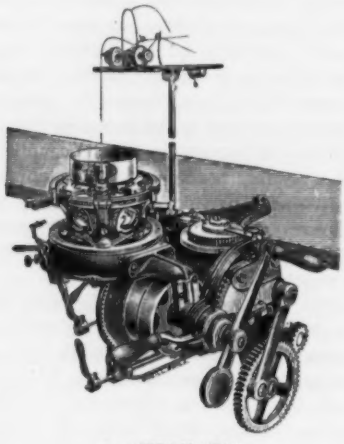


SHIRT MACHINE.

equipped with power in both the circular and reciprocating motions, has a very effective device for instantaneously and accurately raising one-half the needles when the heels and toes are to be knit, and has the automatic picking device for raising and depressing the needles. This machine has had great success. One operator may run three to six of these machines, depending upon the class of work to be made.

The ⅞ automatic machine accomplishes all the work of the ¾ automatic machine with some additional automatic motions. The operator is required to go to the machine only twice during the knitting of the stocking—first, at the beginning of the heel, and second, at the beginning of the toe. It is specially adapted to the making of ladies' plain stockings, called "string work," and in this class of work it is claimed one operator may run from one to twenty machines. The machine is operated with one belt, cuts out the splicing thread after the heels and toes have been completed, throws into action the inoperative needles, and is very nearly full automatic and a simple, strong and durable machine.

The relative advantages of partial automatic and full automatic machines is a subject which admits of endless discussion. Each type of machinery has its strong adherents, not only among machine builders, but among manufacturers. The Branson Machine Co.'s position at the present time is that while they firmly believe in the full automatic machine which they also build and think it embodies the highest development in this line, yet they do not feel convinced that it has sufficient advantages over the 15/16 or ⅞ automatics to recommend the additional outlay. They feel that



¾ AUTOMATIC.

as yet the full automatic machine cannot be made as simple as a ⅞, and must necessarily cost more, in most cases nearly double, and to justify this additional original outlay, should involve a proportionate increase in production or else reduction in the expense of manufacture, which, to their way of thinking, has not yet been arrived at.

The Branson ribbers are built of all sizes and gauges and suitable for all classes of work. They are equipped

with sectional cam cylinders, worm take-ups, double knee and ankle device either one-half the way around or all the way around. Any number of welts from one up to five may be made on the automatic welter.

The plain shirt machine, so called, is built on sizes from 6 inch to 12 inch and in all gauges, and is particularly suited to the manufacture of plain underwear (as distinguished from ribbed underwear), jerseys, sweaters, toques, etc., and is built in

HAND MACHINE.

one, two, three and four feeds, of which one or more may be adjustable. It is also supplied with an automatic striping device which has proved most satisfactory; it does not depend upon suction, but is positive. This striper will make stripes of any width from one round to a yard.

The boot machine is very strong and substantial and suited to the manufacture of lumbermen's socks and felted boots. It is made in all sizes and all gauges, and may be used either with or without automatic take-up rolls.

Special large machines are made by this company similar in many respects to the boot machine, but are lighter and are suited to the manufacture of toques, sweaters and other garments having a large web where the finer gauges only are required. This is the toque machine, and is made in all sizes from 4¼ inch to 12 inch diameter.

Two classes of tufting machines are manufactured by this company—one built on the ribber frame and suitable for making tufted webbing, and another for making tufted hosiery. The Tufted Webbing Machine makes the tufting of one color while the face of the goods is made of another color, or it can make the tufting of wool while the face of the web is made of cotton. This machine is simple, rapid and well-built and makes a very thick and warm fabric, which may be fleeced if desired, and is suited for the making of Klondike goods for cold climates.

Mantle machines are made by the Branson Machine Company for the manufacture of incandescent gas light mantles. They are made in any size required and any gauge to suit the size of yarn to be used.

Winders, loopers, presses, dry boxes, cylinders for knitting machines, cylinders and dials for rib knitting machines, sewing machines, welters, needles, shafting, belting, pulleys, hangers, emery wheels, and all paraphernalia used in hosiery mills can be added with other things furnished by this company, who are prepared to contract for the complete equipment of hosiery mills.

Their catalogue may be had upon application to Branson Machine Co., 506 N. American St., Philadelphia, Pa.

—Individuals with too much spare time on their hands are disputing eagerly whether the year 1900 begins the new century, because the number is round, or whether we must wait for 1901 to begin it.

—The jacquard machine is not only a useful shedding motion when the production of elaborate designs is required, but its individual control of the threads allows a finished or completed appearance to be given to small figures.

COTTON DEPARTMENT.

Principles and Practice in Cotton Spinning.

WM. SCOTT TAGGART.

This is intended to be somewhat of a student's paper. Our mills are fairly well full of middle aged and elderly men who are still subject to that "rule of thumb" system which enables its followers to have, apparently, an intuitive gift for knowing exactly what to do in the way of calculations without going through long processes of reckoning. A good memory for previous experiences, and a knowledge that if not quite correct first time, there is no one to blame or to prevent them from trying again any change they may wish to make, naturally qualifies them as good subjects of "the rule of thumb," and it is surprising how some of our men in authority respect this rule, and find it useful. When we come to the rising generation however, we find almost a resentment existing against anything of this kind.

Now to work. Here we have in Fig. 000 a drawing showing practically the whole gearing of a flyer or roving frame. Its complications of wheel work are sufficient to startle the ordinary student who realizes that to be perfect in his work he must understand the purpose of every wheel he finds here; and yet the calculations of wheel work are of such an elementary character that he needs no more mental exercise in performing them than is entailed in repeating his alphabet or working out the simplest form of fractions.

It is, for our present purpose, presumed that the reader knows a good deal about the purpose and various actions of a roving frame, so a description is not necessary.

One important fact to know about any machine in a cotton mill is the production of that machine. It is a prominent factor in the profit and loss side of the business. Therefore, fix up some means of knowing this as exactly as possible for any given conditions. Let an example be given.

A roving frame working good American cotton, has a front roller 1¼ inch diameter, running at 151 revolutions per minute and has a hank roving of 2. What production will it have?

This question appears to be an exceedingly simple one. As a rule it is calculated in this way.

A front roller, 1¼ inches diameter, running 151 revolutions per minute will turn out:

$1\frac{1}{4} \times 3.1416 \times 151 = 593$ inches per minute.

A mill works, say, 10 hours per day, so that

593 × 10 × 60 = 355800 inches per day of 10 hrs.
= 355800 ÷ (12 × 3) = 9883 yds. per day of 10 hrs.
= 9883 ÷ 840 = 11.76 hanks per day of 10 hrs.
= 11.76 ÷ 2 = 5.88 lbs. per day of 10 hrs.

We arrive now at the exact amount a roller would deliver of 2 hanks, if it worked for 10 hours. But a roller never works every minute of the engine time. There are stoppages for piecing, for cleaning and for doffing, and this time must be subtracted from the engine time of 10 hours.

Here then comes the crucial point in the problem. What percentage of lost time shall we allow? It used to be the practice to allow a fixed per cent. for slubbing frame, a different per cent. for intermediate and so on; but this is not sufficient, for a practical mind will readily understand that the lost time varies for every change of hank roving. For instance, a two-hank roving will require doffing a certain number of times per day, but a five-hank roving must be doffed a little less than one-quarter as often so that in the latter case the percentage of lost time is considerably less than with a two-hank roving going through. In other words we must know exactly the time taken in piecing up and doffing the bobbins from a

frame before we can estimate its production.

It is an easy matter to find out the average time taken in piecing and doffing during a set. The writer has done this times innumerable in Lancashire mills, so one of these averages can reasonably be taken as a specimen. The time taken on a roving frame of average length, worked out is about 13 minutes time lost in doffing the bobbins and piecing up the broken ends, etc.

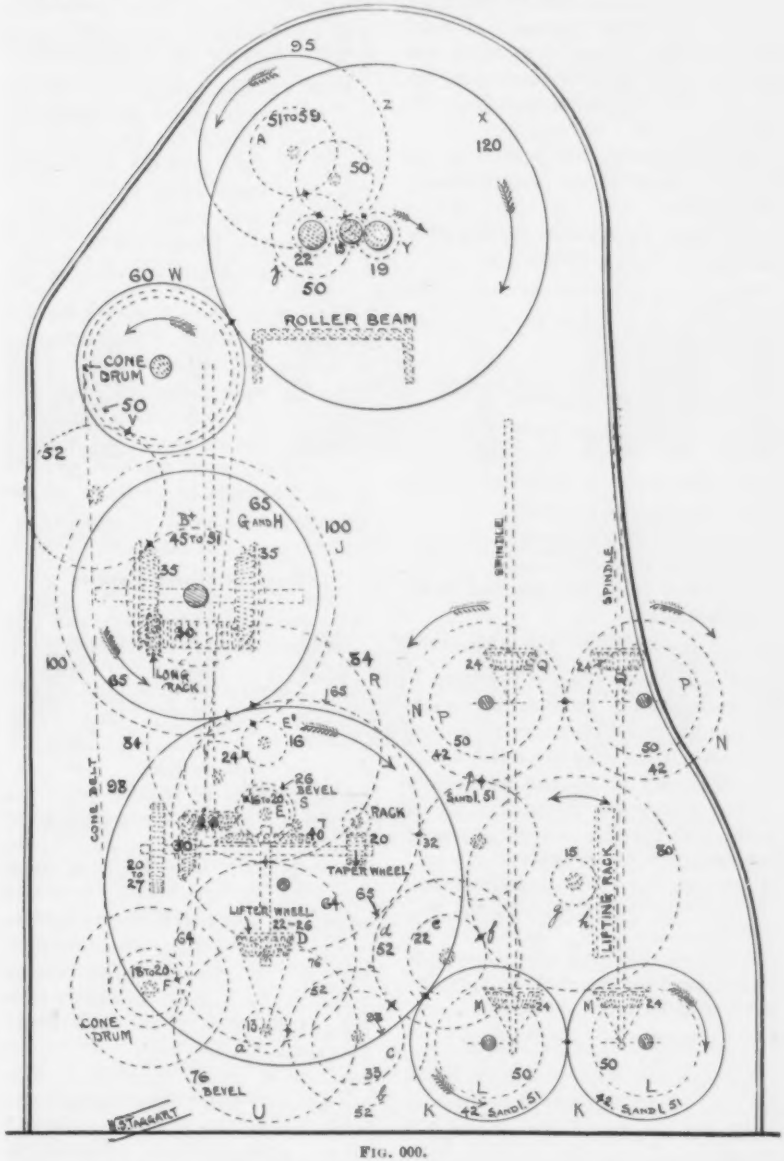


FIG. 000.

It will be observed that the time of doffing and piecing is expressed in minutes. This is done simply because these operations occupy about the same time on any given machine

whether two or five hanks are used. The next thing to do is to find the weight of roving on a full bobbin, this we will suppose to be 10½ ounces. Knowing the weight of bobbin, hank roving and twists per inch, we can find the time taken to build a full bobbin. For instance, first find the length of roving on the bobbin as follows:

1st. Weight of full bobbin in lbs. × hank roving × 840 × 36 = length in inches.

2d. Find the total twist in roving on bobbin.

Length in inches × twist per inch = total twists.

3d. Find time taken by the bobbin to become full.

Total twists on bobbin ÷ revolutions of spindle per minute = minutes taken to fill bobbin.

These three rules have not been worked out because they depend on each other and can all be incorporated in one rule, for instance:

(Weight of bobbin in lbs. × hank × 840 × 36 × twist per inch) ÷ revolutions of spindle per minute = time for one set.

Example: The time required to fill a bobbin equals

(10½ × 2 × 840 × 36 × 1.76) ÷ (16 × 1050) = 66.52 minutes.

We now know exactly how long it takes a bobbin to get full. If we add to this time, the time lost in doffing, etc., we get the time it takes between the beginning of one set of bobbins and the beginning of another set of bobbins, so that the number of sets of bobbins in 10 hours equal

(10 hrs. × 60 minutes) ÷ (minutes to build bobbins + lost time in doffing, etc.) = (10 × 60) ÷ (66.52 + 13) = 600 ÷ 79.52 = 7.54 sets in 10 hours.

A bobbin contains 10½ ounces of roving so that the production in ten hours will be

(10½ × 7.54) ÷ 16 = 4.948 lbs. per spindle. Or 4.948 × 2 hanks = 9.896 hanks per spindle.

On referring back it will be noted that if the front roller continued to work for 10 hours the production would be 11.76 hanks, so that from this we find that there is an actual loss in time equal to 16%, or in other words, the time lost in doffing, piecing, etc., results in a loss of production equal to 16%.

Still keeping to the same machine, suppose the hank was changed from 2 to 5. Then the calculations would be

1. (840 × 36 × 2.795 × 5 × 10½) ÷ (1050 × 16) = 264 minutes per set.
2. (60 × 10) ÷ (264 + 13) = 2.16 sets in 10 hours.
3. (2.16 × 10½) ÷ 16 = 1.41 lbs. in 10 hours.
4. 1.41 × 5 = 7.05 hanks in 10 hours.

With a 5-hank roving going through and the spindle speed at 1050 revolutions per minute, the twist per inch would be 2.795 and the roller speed (1¼ dia.) would equal 95.

A continuous running of 10 hours would equal a production of

5. (1¼ × 3.1416 × 95 revs. × 10 hrs. × 60 min.) ÷ (12 × 3 × 840) = 7.40 hanks.

Comparing result 5 with 4 we find that there is a loss of production due to doffing, etc., equal to 4.7%.

We can now understand how it is that no fixed percentage can be allowed for loss of time on any machine except when such machine happens to be continuously at work on one numbered hank only.

Types of Woven Fabrics.

THEIR CHARACTERISTIC FEATURES, CONSTRUCTION AND MANUFACTURE.

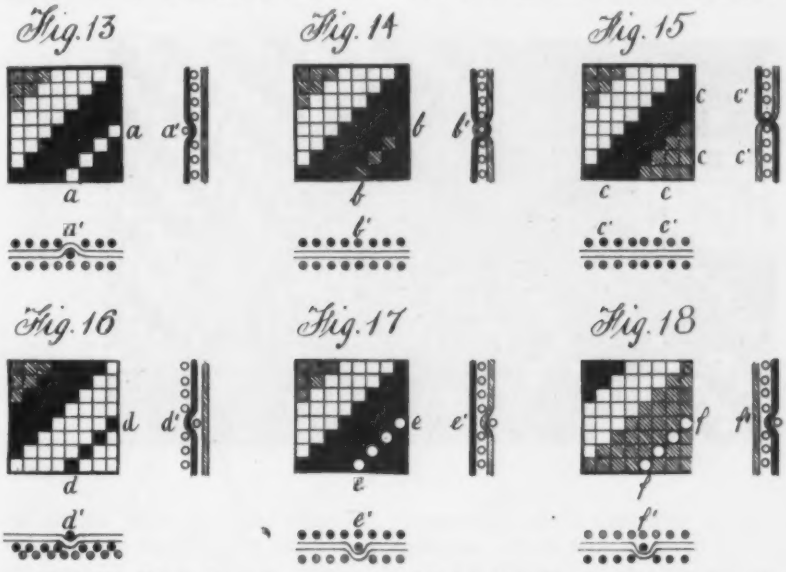
ARTICLE III.—(Concluded.)

HARRY NISBET.

(Copyright.)

The methods of binding warp and weft are indicated in Figs. 13 to 18. Binding of the figure is done in the usual manner. Weft figure is bound with the ordinary warp, and both warps are bound with weft where required, in the manner shown at a, a¹ Fig. 13. Warp-ends should not be bound in the manner shown at b, b¹ Fig. 14 by sinking one, and lifting its fellow on the same pick; which puts undue strain upon those ends, and gives a "pitted" appearance in the cloth, due to their pulling against each other. Although both warps lie together at the back of the cloth when weft is on the face, care must be taken to prevent them being together on the face at the same time: not only to avoid their confusion, but because a

warp effect requires a weft foundation, and vice-versa. The two systems of warp must therefore be separated by weft, as shown at c, c^1 Fig. 15, when either of them is required on the face. The manner of binding weft when the latter is over both warps is shown at d, d^1 Fig. 16. Binding points for the extra warp-ends must be selected in such places as will prevent them from showing through on the face. They must therefore be lifted over weft when the latter is at the back of the cloth, and the warp-ends above will cover them as shown at



e, e^1 Fig. 17. Where there is a mass of warp on the face as in the sides of the pyramids in the design, there is no difficulty in selecting the binding points; but in a ground weave like the one employed, there is greater risk of them showing through. These observations are also applicable to the binding of ordinary warp-ends to prevent their floating too far at the back when covered with extra warp-ends on the face, as shown at f, f^1 Fig. 18. To ensure the foregoing conditions, the card-cutter must be instructed to punch holes in cards where there is paint on design paper represented by solid squares, and round white dots; and to leave cards blank where paper is bare, and where there is paint represented by shaded dots.

Extra-Weft Figuring: Extra picks of weft, instead of extra warp-ends, may be employed to give additional embellishment to a fabric. This method of introducing extra material is, of course, more costly than the preceding one, because a loom fitted with a checking motion must be used; also, additional pattern-cards are required where the extra picks are inserted. By reading weft for warp, and vice-versa, in the foregoing description of fabrics figured with extra warp-ends, the method of extra-weft figuring will be clearly understood.

If the cloth is to be woven in a loom having a double box at one end of the sley only, the cards will have to be laced for two picks of ordinary weft, and two picks of extra weft alternately; but a much better result is obtained by employing a loom fitted with two boxes at each end of the sley, and with a pick-and-pick motion, when an ordinary and extra pick may be inserted alternately. The latter method is, however, more expensive.

Fig. 19 illustrates the development of a design for an extra-weft effect.

The fruit is developed with the extra material, and is indicated on design paper by paint represented by shaded squares. Long floats of weft in either system must be bound by warp, and not by taking one pick to the back and lifting the other to the face, for similar reasons to those stated with reference to extra-warp figuring, and illustrated at b, b¹ Fig. 14. Either system of weft is prevented from floating too far at the back of the cloth by binding over warp when the other system is on the face, indicated in the design by paint represented by round white dots.

For ordinary picks, the card-cutter must be instructed to cut paint represented by black and shaded squares; and for extra picks, to cut that represented by black squares, and also paper. Paint represented by round white dots must always be missed, for these indicate the binding points of the lower weft, and will, therefore, not be visible on the face of the fabric.

Where extra weft is indicated in the design, each horizontal space on design paper represents two cards, one for a pick of ordinary weft and one for a pick of extra weft, both of which should bear the same cardinal number; but cards for extra picks should be distinguished from those for ordinary picks by affixing to the cardinal numbers some mark, as an X. For a loom with a double box at only one end of the sley, the cards (for Fig. 19) must be laced in the following order, namely:—1, 2, 3, 3x, 4x, 4, 5, 5x, 6x, 6, 7, 7x, 8x, 8, and so on, but if weft is inserted pick-and-pick, cards must be laced as follows: 1, 2, 3, 3x, 4, 4x, 5, 5x, and so on.

Some method should be devised whereby cloth is taken up at half the usual rate of speed when the extra figure portion is weaving, because extra picks must not add to the length of the fabric. This may be accomplished by connecting the stop-catch of the take-up motion to a spare hook in the jacquard machine (or if all are engaged, one may be fixed up) and holes punched in extra cards to cause the catch to be raised when such cards operate.

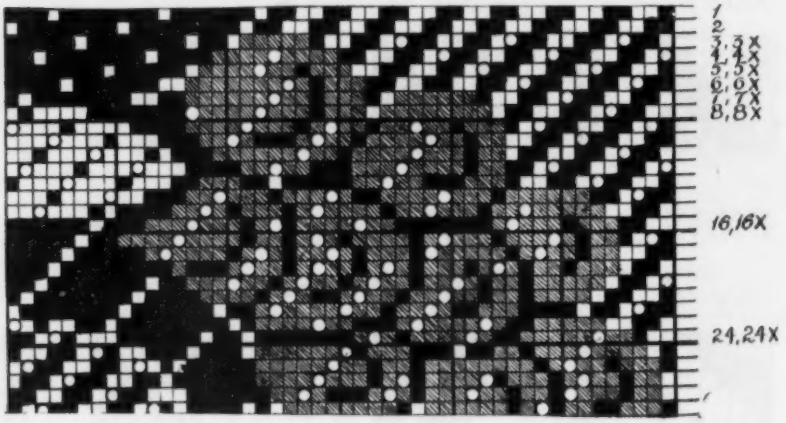


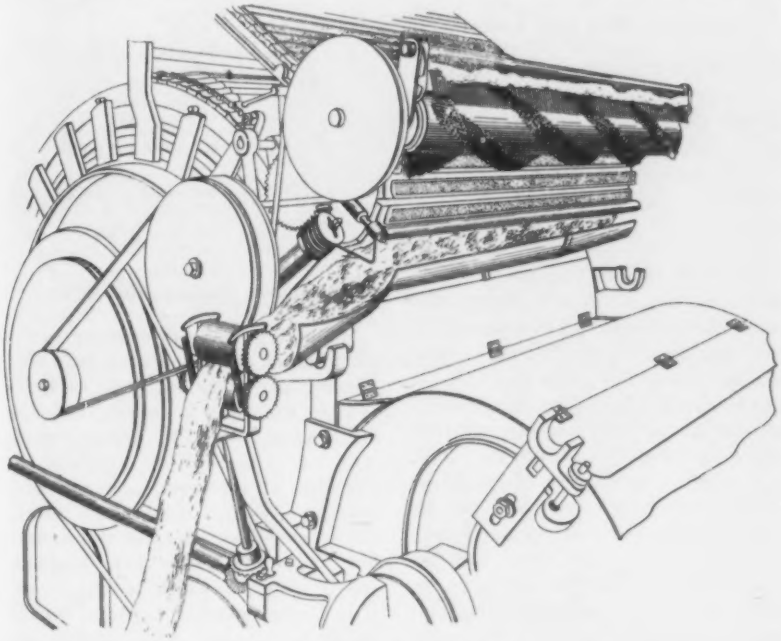
FIG. 19.

—The dyeing of wool, cotton, and silk benefited little by the first progress made in the art of color in the century, but still persisted in traditions handed down from the generations of the past.

—Mixed wool and silk goods may be dyed by a judicious selection of the coloring matters in two colors, and even if three fibres are present in one fabric they may even with care be dyed in three different colors.

Removing Card Strippings.

Russell W. Eaton, agent of the Cabot Manufacturing Company, Brunswick, Me., has recently gotten out a device for removing the strippings, or waste, from the traveling flats of a carding engine, whereby these will be discharged in the form of a continuous and substantially uneven sliver, which can be subjected to subsequent operations and made into yarn. We illustrate his device, which will be clearly understood by practical carders without the necessity of referring to its parts by letters, or otherwise.



STRIPPING DEVICE.

As will be seen, a trough-like receptacle is placed below the knife, and in front of the traveling flats, and extend transversely across the latter, to receive the strippings as they are removed from the flats by the knife. The strippings pass through a trumpet, not seen in the illustration, and conducted through a set of rolls, and thence passed continuously into a can, or other suitable receptacle. The strippings free themselves readily from the traveling flats, except at the edge near the rolls, and to facilitate their removal at this point, a clearer is attached.

A Defect in Cotton Carding.

Editor Textile World:

I have been greatly interested in the articles appearing in your magazine, written by C. C. Hedrick, and am confident that but few published articles on cotton manufacturing are so clear and to the point.

From my observation of the process of cotton carding, I think there is one great defect in it, whether relating to top flats or traveling flat cards. It is that of running the outer sides of the carded web into the good sliver. I think it safe to say that seven-tenths of all slugs, bunches and other imperfections seen so plainly in the gray cloth comes from imperfections in the outer edge of the web as it leaves the card. This defect is more noticeable in single carding.

I am well aware there have been various devices, though at best only

make-shifts, to overcome this trouble. My plan is to use two rings similar to those in use on a wool card finisher, where the Apperly feed is used, such an attachment as would take the stock off the ring wires, leaving only the clear, clean web of carded cotton for the subsequent process.

I am well aware that for this idea of an adjunct to the cotton card I will be sharply criticised, but I cannot see any other way out of this trouble and would like to hear the opinions of others on the subject.

X.

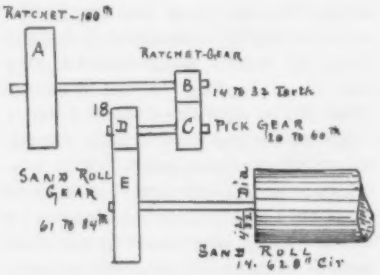
Changing Picks on a Loom.

Editor Textile World:

Can you inform me of a short rule to find the proper gears to put on a cotton loom, when changing from a certain number of picks to another number?

T. H. J.

The best answer that we can give to our correspondent is to supply him with the accompanying diagram of the take-up gearing and the rules which control the picks per inch in the cloth on a Lowell loom. A short method of figuring the pick gearing when changing the picks in the cloth, is shown in rule 1. This is simply an example in proportion, and may be readily worked out by anyone familiar with common arithmetic. To explain, where it may be necessary, in order to make the accompanying diagram of gearing clear, we will state that the cloth passes partially around the sand roll shown in the sketch, which is 14.62 inches in circumference. This roll is driven from the ratchet gear A, through the gears B, C, D and E. At each pick the ratchet gear is caused to move one tooth, and through the gearing referred to. The sand roll is also moved. The extent of the movement of the sand roll is controlled by the pick gear C, which is changed to suit the number of picks in the cloth. Rule 2 shows the method of finding the pick gear from the diagram of gearing. This rule may be used, if it is desired, to prove the accuracy of the first rule.



RULE 1.

To find teeth in pick gear when changing picks: (Teeth in present pick gear × required picks) ÷ present picks per inch = teeth in pick gear.

Example: Teeth in pick gear, 22.
Required picks, 65.
Present picks per inch, 43.
(22 × 65) ÷ 43 = 33 tooth pick gear.

RULE 2.

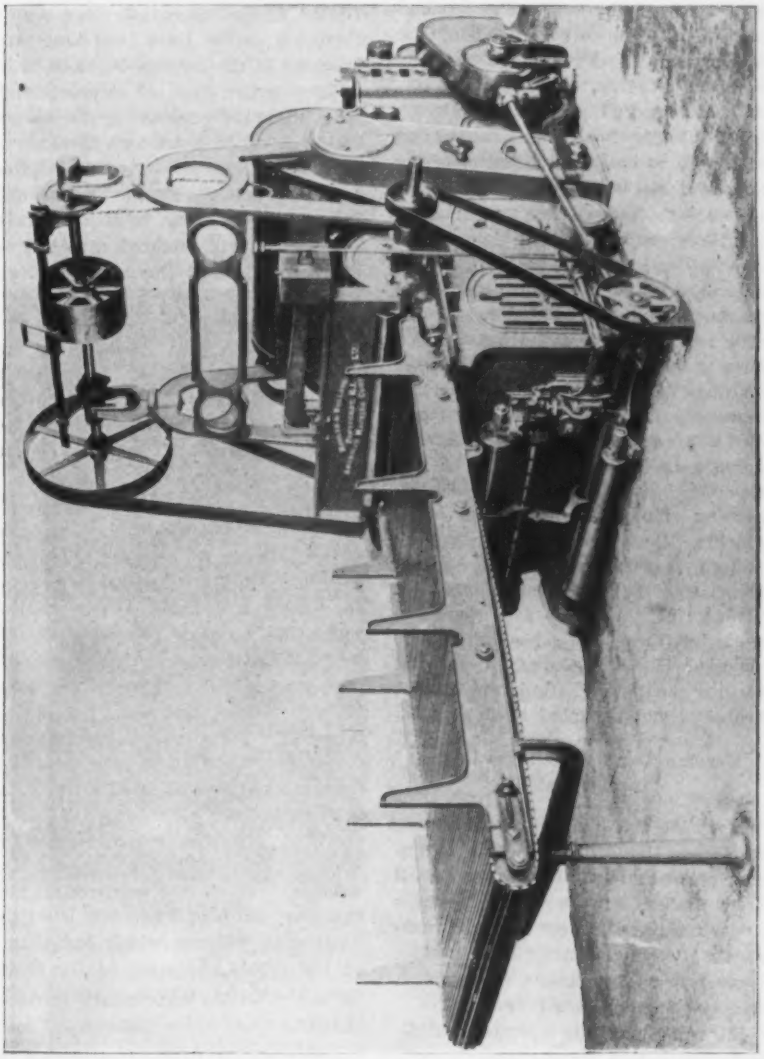
To find teeth in pick gear: [Picks per inch × B × D × 14.62 (cir. of sand roll)] ÷ E = teeth in pick gear.

Example: Picks per inch = (40 × 14 × 18 × 14.62) ÷ 72 = 147369.60 ÷ 72 = 20 tooth pick gear.

Improved Picking Machinery.

We take pleasure in drawing to the attention of our readers the improved picking machinery built by the Howard & Bullough American Machine Co., Pawtucket, R. I. Limited space will not permit us to illustrate the full line of machines, and we have therefore selected the finisher picker, cut of which accompanies this article. This machine contains many improvements, amongst which we may mention a new calender head or consolidated lap head. This allows the machine to be stopped by the drop handle without breaking the lap. Besides which, when the lap is of the required length the machine knocks off and the lap is not broken, as the large lap rolls stop. By this improvement the softening and consequent stickiness and splitting of laps through constant revolving after the machine has knocked off is prevented. It also enables the machine to be stopped at any time during the formation of a lap without breaking the lap.

The improved evener recently introduced by this firm has met with great success, and the results obtained are very satisfactory to the mills. This evener was introduced on the market after exhaustive experiments and thorough tests. The feed rolls and evener plates are arranged on the same principle as the well known Lord system, which gives great cleaning capacity owing to the bite of the feed plates being close to the beater. The plates are placed on top of a 3-inch steel evener roll, thus furnishing a rigid support for the evener plates and ensuring that all the variation in the thickness of the laps will be communicated to the evener belt.



The evener cones are conveniently placed under the feeding apron or lattice, as shown. The lower cone hangs in a swinging cradle, allowing the belt to be made endless and kept at an even tightness at all times. The

cones are 30 inches long, and a 2-inch belt is used. The belt shipper is worked by a screw similar to the railway head evener. A differential device to regulate the amount of traverse of the belt is employed. The speed of all parts connected with this evener is very slow, thereby preventing wear. The usual speed of the driving cone is only about 500 revolutions, and the driven cone about 300. All bearings and parts are easily accessible. The beater and fan shafts are made of hard gun metal ensuring long life. All bearings where it is possible are made in the bush form, making them easy to replace when worn. The special construction of these bearings prevents oil from getting inside the machines, besides which they are very easy to adjust. It has been customary to make the beater bearings adjustable. In this machine, however, the beater boxes are fixed, and the feed rolls are adjustable, thus doing away with the liability of getting the beaters out of line, thereby causing them to heat and wear quickly. Countershaft complete with pulleys is furnished with each machine, as shown in illustration. Two blade rigid beaters are generally used, but three blade beaters can be supplied if required, or the special carding beater or Houghton patent beater with corrugated teeth.

German Textile Factories in the United States.

Many of the textile manufacturers of Saxony have at last come to the conclusion that it is impossible to sell their products in the United States under the present tariff law, and rather than lose the American market, several firms are about to establish factories in the United States.

Edward Stohr, the manager and director of the Kammgarnspinnerei, Stohr & Co., of Leipzig-Plagwitz, was the first textile manufacturer to anticipate the high duty which the United States would put upon all importations of textiles, in order to build up its own manufactures. Mr. Stohr, with the assistance of a number of German capitalists, organized and built the Botany Worsted Mills, at Passaic, N. J., about fifteen years ago. This textile factory is today one of the largest and best paying in the United States. Many German manufacturers have been watching the progress of the Botany Worsted Mills with a great deal of interest, and, now that its success is no longer doubtful, other firms have decided to establish factories. Two noticeable examples are H. Bruhns Sohne and Ernst Fr. Weissflog, of Gera, Reuss. The former will establish a factory in Pennsylvania and the latter in New Jersey.

There are a number of textile firms in Germany which, it seems to the United States Consul at Leipzig, could be induced to establish branch factories in the United States, provided they are given the support and encouragement required.

--We had been accustomed to doing a trade of three or four millions a year with the United States in worsted coatings and linings. When we had this trade we were prosperous, when we had it not we were depressed, and, it was mistakenly supposed, could not be otherwise. But the purchasing power of our own people had been underestimated. The necessity of finding an outlet forced us into the home market, and we have found that, properly worked, this is a gold mine far more productive than any across the Atlantic. It is the surprising fact that our own people can buy what the Americans will not which has changed the whole character of the situation as if by magic.—English Exchange.

—The manufacture of sulphated oil is analogous to that of indigo extract from indigo, and consists in treating the oil with sulphuric acid until a neutralized sample is completely soluble in water.

WOOLEN DEPARTMENT.

Worsted and Woolen Manufacture.

FRED BRADBURY.

Vestings are a type of cloth that for very many years now have retained an important place among the woven textures produced for men's wear. They admit of a certain amount of decoration which is conspicuously absent in many woolen and worsted productions. The decoration usually consists of a series of small spots or minute figures judiciously arranged

FIG. 1. FACE.

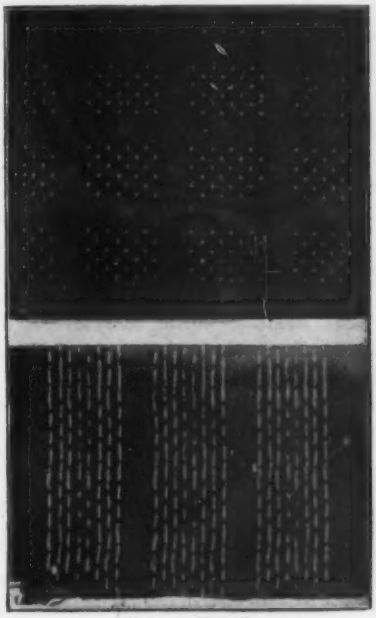


FIG. 2. BACK.

and composed of bright colored yarns such as silk, mohair, etc., upon a wool surface. The ground weave of the texture is generally some standard make or a simple and effective design, which is sometimes enhanced in value by the combination of two or more designs to produce a check weave effect, which is then spotted with the special coloring threads to suit. It is the introduction of these colored threads which give the fabrics their special features and also furnishes a field for the designer's ingenuity, not only in the disposition of the small colored spots and in making them distinctly manifest on the surface of the texture, but also in utilizing them to the best advantage at the back of the cloth. The colored spotting threads may be used as extra threads of warp or as extra picks of weft with either single or double cloths. The more thoroughly the designer is conversant with the fundamental principles of backed and double cloth designing, the greater will be his opportunity for obtaining the best results, both as regards decoration and construction, though this knowledge is not absolutely necessary since fairly good results can be obtained with only a limited knowledge of backed-cloth structure.

Of the great variety of vestings produced I propose only to supply and fully explain the manufacture of the following examples, which, beside being instructive, will be found to possess very many important characteristics.

Two illustrations of an actual cloth are given in Figs. 1 and 2. Fig. 1 shows the face and Fig. 2 the back of the structure. The face of the fabric consists of a check weave effect. The ground of this check is studded with very small spots of blue silk, while upon the horizontal and vertical portions of each repeat of the weave forming the check, larger spots of dark green silk are visible, and at the corners of each check a small diamond effect is produced by four small spots of old gold colored silk.

Reverting to Fig. 2 we notice that these extra warp threads do not flush too loosely upon the back of the texture as is very often the case in many structures of this class. The remedy of this defect will be fully considered when the weave structures are dealt with.

The particulars of manufacture are as follows:—Face warp 2/40s Botany.

black; weave as Fig. 3, 56 ends of face exclusive of silk warp in 64 inch reed. Extra silk warp, two threads of 90/2 spun silk. Shades as below.

Note. The two threads of silk are to be drawn through each mail and used as one thread.

Face weft 2/40s Botany, black.

Backing weft 2/48s cotton black. Weave as Fig. 4.

Woven I pick of face weft (56 picks per inch) 1 pick of back weft (56 picks per inch).

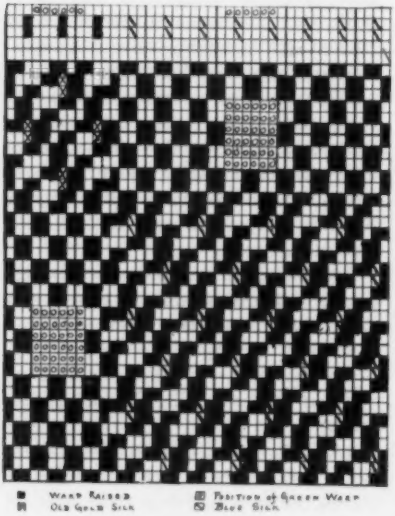


FIG. 3.

Warped as follows:—

	3 threads black Botany
	1 thread old gold silk
6 threads	1 thread black Botany
	1 thread dark green silk
	1 thread black Botany
	1 thread old gold silk
	1 thread dark green silk
4 threads	1 thread black Botany
	1 thread dark green silk
	2 threads black Botany
	1 thread old gold silk
15 threads	4 threads black Botany
	1 thread light blue silk
	3 threads black Botany
	1 thread dark green silk
	1 thread black Botany
	1 thread light blue silk
	1 thread dark green silk
6 threads	1 thread black Botany
	1 thread dark green silk
	1 thread black Botany
	1 thread light blue silk
	1 thread dark green silk
15 threads	4 threads black Botany
	1 thread light blue silk
	1 thread black Botany

67 threads in one repeat of the pattern or

44 threads in one repeat of black Botany
12 threads in one repeat of dark green silk
8 threads in one repeat of light blue silk
3 threads in one repeat of old gold silk

The weave elements used in the construction of the foregoing woven structure are supplied at Figs 3, 4 and 5. Fig. 3 shows the complete face weave together with the relative positions of each color of extra silk warps. The solid black squares represent the warp raised in the body of the cloth; the "Os" show the position of the green warp on the face of the cloth; while the crosses and diagonals indicate respectively the places where old gold silk and the blue silk warps appear on the surface.

To the back of this cloth a cotton weft is added which weaves 3 weft, 1 warp, shown at Fig. 4; but this cotton weft is scarcely perceived since the extra silk warp when not required on the face floats on the back of the cloth and underneath the cotton weft, except at such places where it is used on the face for spotting and where it binds over the cotton weft. The cotton weft, therefore, serves a double purpose; first, it increases the weight of the fabric without its presence being detected, and second, it binds the long flushes of silk warp to the back of the texture.

The first half of this design is fully developed at Fig. 5 which, being an actual working design, shows very fully how the cotton weft back is stitched to the ground texture, and also how it binds the extra silk flushes at the back of the cloth. The figuring silk warps are also clearly shown at the position where they are brought to the surface of the fabric. The following is a detailed explanation of this plan.

The respective kinds and colors of warp threads are shown by the various markings above the weave plan and of the weft threads at the right hand side, in addition to which the arrangement of the warping scheme coincides.

The Botany ground face warp threads "a" are indicated by the blank spaces; the old gold silk "b" by

the solid black marks; the green silk threads, "c" by "O" in a square, and the blue silk threads "d" by the diagonal marks. The solid black marks at the side indicate the cotton weft "f" while the ground weft "e" is left blank. The raising marks for the

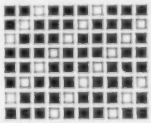


FIG. 4.

ground are in solid black squares, the green silk is "O" in a square, the blue silk is denoted by diagonals in a square. No old gold silk is up in the section fully developed, hence there are no markings except the bindings which are indicated by crosses, which also mark the binding places for this and each of the other colors of silk where the cotton weft is allowed to flush on the back of the silk threads and thus avoid too loose flushing of the silk warp at the back of the cloth.

When the cotton weft is inserted the raising marks are shown by a dot in a square, so it will be seen that the extra silk warps are never allowed to appear on the surface for binding, and are only to be seen on the surface of the cloth at the special places where they are to produce effect.

A further illustration of the weave structure of the foregoing fabric is fully revealed by the cross section through the warp supplied at Fig. 6. The letters.

a, represent the all-wool warp threads
b, represent the old gold silk warp threads
c, represent the dark green silk warp threads
d, represent the light blue silk warp threads

The letter "E" represents the face weft yarn, wool, and "F" represents the backing weft yarn, cotton.

From the illustration it will be noted that the face weft "E" inter-

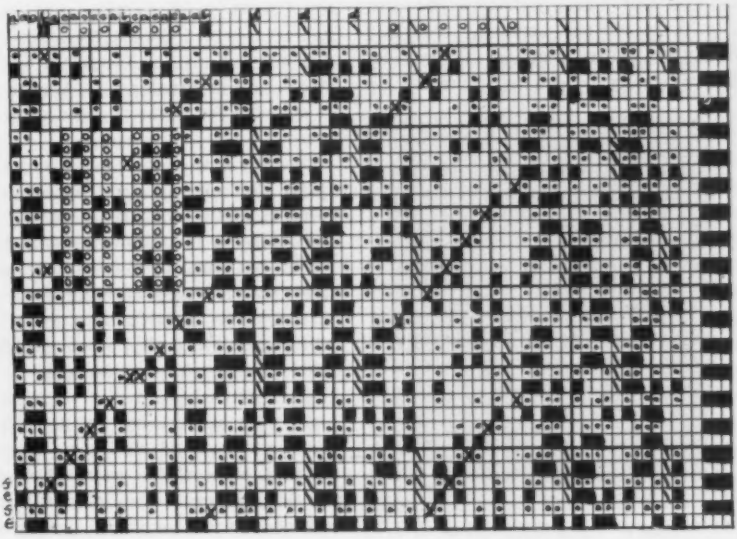


FIG. 5.

weaves with the face warp threads "a," as in the separate face design, and is in no way altered by the introduction of the extra silk warp threads; but notice also that weft "E" not only weaves 3 and 1 twill at the back of the ground cloth, but that it flushes entirely over the cloth at those places where the dark green silk threads "c," flush on the surface of the texture. The wisdom of this becomes apparent when it is pointed out that since the cotton weft picks are laid at right angles to the green figuring threads, but underneath them, the tendency of the

latter is to cause the threads "c" to stand out upon the surface of the texture with greater distinctness. It should be further noted that the cotton weft picks "f" pass under the silk warp threads "b, c and d," and so

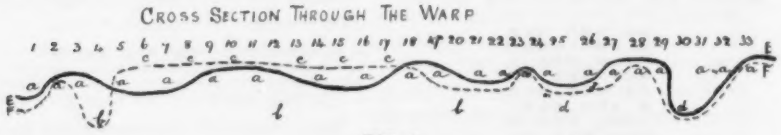


FIG. 6.

bind them to the back of the woven cloth when they are not required for spotting effects upon the face.

From the first half of the fully developed and working designs given at Fig. 5, it will be observed that one complete repeat occupies 67 threads, but this may be drafted down so as

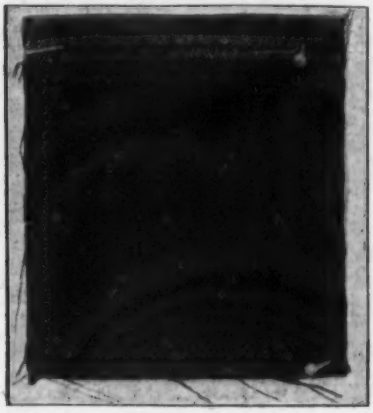


FIG. 7. FACE AND BACK.

to weave upon a very much smaller number of heald shafts, which any designer conversant with drafting can do for himself, or it may be woven straight draft where jacquard machines are available and this latter method would possibly be the cheapest.

(To be continued.)

Plaids.

THOS. R. ASHENHURST.

(Continued from January.)

The predominant features in the two classes of tartan referred to, in the Campbell and allied tartan, have been blue and green ground, and in the Royal scarlet ground, leaving the dress Stewart or Victoria aside as a special arrangement of the Royal for a specific purpose.

It may be said that the majority of Scotch tartans consist mainly of one of those two combinations, the width and variety of the squares and bars being varied and variously colored overchecks used. There are some, however, which depart from this, but not very many, and only a few of those can be cited as good examples of coloring for in many cases the combinations are very crude.

One or two may, however, be referred to both as good examples of coloring and balance of patterns. The first to occur is the Macpherson dress white, but life and variety is given to it by two red bars running down the tartan. This is virtually a black and white; two white ones down the black, with a very thin yellow one in the centre. This is probably as pretty a plaid with a black and white foundation as one could desire to produce. Coming to the plaids where there is a decided departure from the two great classes, the most striking, probably, is that of Brodie, where the ground is dark brown (predominant) and blue with a large overcheck of green separating those two colors, and overcheck lines of yellow and red through the brown and a thin black separating the green and brown, and green and blue, respectively; also a red band through the centre of the blue. The result is not only a rich combination of colors, but also a most strikingly effective pattern.

Perhaps the next most effective departure is that of the Gunn tartan. This consists of brown and green, with an overcheck of red running through the centre of the green, and three narrow green bands, cutting the

brown into four equal parts. There are many others which might be referred to, but those given will be sufficient to serve the present purpose. It may be said that the large majority of the Scottish tartans are not only good in their color arrangements, but also happy in the arrangement of their lines and squares. There are, of course, exceptions, but they are comparatively few.

It may be well now to examine the balancing of the parts and colors in a few of the tartans before proceeding to examine other plaids for the purpose of determining the best basis upon which to treat the subject.

It must not be supposed that the term "balancing of parts," means that all the colors must be present in exactly equal quantities any more than the term balance of structure in a cloth implies that warp and weft should be exactly equal; for every manufacturer knows that this must be varied according to the pattern of the fabric. In the case of plaids the colors must balance each other according to the special, or, as scientists put it, the mental effect desired to be produced.

Following, in the first instance, the tartans of the Campbell and allied clans, and being of about the same intensity, they are present in about equal quantities. The presence of the black tends to modify them, then life and character is given to the whole of the overcheck of bright colors. As a rule, the white overcheck is not altogether pleasing unless separated from the color by a line of black. No matter how narrow this line may be it has its effect. Now turn to the Stewart plaids. Red ground with the blue bands form the leading features. Richness, warmth and dignity being the result of the happy combination, whilst the presence of the black and green bands relieves it of any gaudiness of effect. In the same way the Prince Charles Edward Stewart is rich in effect, but is more subdued than the Royal by the presence of larger quantities of black and green, and the mass of red not being so great in any one square. The general arrangement is practically on the same lines but not so gorgeous in effect. The Macbeth is after the same order but a blue ground takes the place of the red in the Royal, and there is more yellow which makes up for what would otherwise be a lack of life and brilliancy.

The Victoria or dress Stewart is intended for a special purpose as evening wear, therefore life, lightness, vivacity, or whatever term one may care to use, are necessary. The large mass of white is relieved by the red band through its centre and its approach to the black and green is softened by the presence of the band of blue. It would be difficult to find two types of plaid which would illustrate more perfectly the fundamental principles of plaid designing than those dealt with.

Another feature which has not been mentioned, but which is most fully illustrated in the Royal tartans, is that variety of line as well as variety of color may conduce to beauty in the design. In this respect it would be difficult to conceive a more beautiful design than the Victoria.

To turn now to what might be termed the unorthodox plaids, an endless variety might be given, but the task and cost of illustration would be too great, so that a few specimens must suffice. Black and white plaids are always popular and a great variety made, not all equally pleasing. One very handsome one is being exhibited at present and consists, roughly speaking, as follows:

1	inch	black
1/2	"	white
1/2	"	black
1/2	"	white
1	"	black
1/4	"	white } repeat
1/4	"	black } 4 times
1/4	"	white

Thus making two large bars and five small ones of white on a black ground.

This class of plaid is often very much improved by the introduction of

gray as the general effect is much softer, the gray breaking the hard lines of the extremes of black and white. It does not necessarily imply that the gray must come between the black and the white, but a gray bar may be run through either of them, as a rule through the black by preference, and the black, white or gray may be made to predominate according to the desired effect, dark, light or medium tone.

As a rule it is a mistake to make one-sided patterns, that is, patterns where both sides are not alike, as with a heavy bar on one side and a light or thin one on the other. Sometimes good effects are obtained, but as a rule they are not a success. Although there is not the element of color to deal with, as much judgment is required in making black and white plaids as in making colored ones.

In dealing with colored plaids there is no element in the composition which requires more care than the use of white especially as an overcheck, as, if incautiously employed, it tends to destroy or at least detract from the richness of the combination. For instance, here is an outline of a plaid, good in every respect, but for the presence of white as an overcheck which has the effect of reducing the quality of all the colors.

The pattern is as follows:

1/2 inch black	1/2 inch black
1/16 " red	1/8 " white
1/8 " green	1/2 " red
1/8 " red	1/8 " black
3/32 " green	3/32 " red
1/16 " red	1/16 " black
3/16 " green	3/16 " red
1/16 " red	1/16 " black
3/32 " green	3/32 " red
1/8 " red	1/8 " black
1/2 " green	1/2 " red
1/16 " red	1/8 " white

The design is certainly handsome, but the white bars certainly detract from the general quality of the combination.

Here is another combination in which white is introduced, but care is taken to make it form part of a whole instead of being an isolated overcheck:

1 inch black	3/16 inch black
3/16 " red	3/8 " red
1/8 " black	1/16 " black
3/16 " red	3/8 " red
1 " black	3/16 " black
3/8 " gray	3/8 " gray
1/8 " white	1/8 " white
3/8 " gray	3/8 " gray

In this the white forms the centre of a graduated square of black, gray and white, which is certainly a more legitimate way of using it than making an isolated overcheck upon strong colored grounds.

Some very handsome plaids are produced where the colors are massed in large quantities and relieved by a good overcheck. Here is one for example:

1 inch black
1 " brown
1/4 " light blue
1/16 " white
1/4 " light blue

The white is not at all objectionable here as coming in the centre of the pale blue its influence is modified; but anywhere else in this composition it would have been objectionable. In such designs as the Victoria Stewart, or where white is a predominant feature, the results are good, but in small quantities it must occupy such a position in the pattern that its influence upon the colors will be in the least possible degree prejudicial; in fact, care should be taken to make each color enhance the value of the others. Instances might be given by the hundred of both good and bad combinations but it would be too tedious.

So far, the reference has been to cloths of ordinary construction such as simple twills where the relations of warp and weft to each other are about equal, but there are many fabrics where the warp largely predominate over the weft, and as a consequence, if checked in the usual manner, the colors of the weft would be scarcely visible on the face. In such cases what might be termed, for want of a better name, checked stripes are produced. That is, a pattern is made in the warp in which all the desired colors are introduced, and an overcheck is made by the use of a few

threads of very bright colors; these being thrown to the face of the cloth as much as possible in the order of inter-weaving. A good example of this is shown where the pattern of the warp is based upon a tartan of the Campbell type, and the ground weft is black throughout, the effect of a plaid being produced simply by an overcheck of bright colors thrown to the face. Some very brilliant effects are obtained in this way, and it is an expedient which may well be resorted to whenever either warp or weft predominate, but mostly where the warp is predominant.

One feature in designing plaids should never be overlooked. They should be so arranged that a given number of complete patterns make up the width of the piece, and so divided that both sides of the piece are alike, otherwise not only will the general appearance of the piece be spoiled, but the cloth is not likely to cut up to advantage.

Plaids may be made any size to suit the requirements of the customer, or the purpose to which they are to be applied, but the proportions of the several parts should be adhered to as closely as possible, and any departure of the relative quantities of the several colors should be made, as far as possible, in the ground colors, or those which occur in the largest masses. Then the designing of plaids may be summed up in a few words.

1st. Due regard to combination of colors.

2d. Proper balancing of the several parts.

3d. Variety of line without breaking up the pattern so as to destroy character.

Every plaid should have a distinctive character both as to color, lines and general effect.

Spinning Wool in a Wet State.

BY S. B. H.

The question was recently asked whether it was injurious to spin wool in a wet condition—that is, only whizzed in the hydro-extractor. All authorities are unanimous in condemning such a procedure. There is no doubt that the working of wet wool introduces various complications into the carding, as well as the spinning process, and it should be avoided under all circumstances. It is true that a great diversity of opinion exists as to the preliminary processes of preparing the wool for carding, and this stage in the manufacture of woolen goods is frequently not treated with that care and consideration which its importance demands, to the great detriment of both machinery and material.

By far the most important requirement in carding is that the wool should be thoroughly dry. Without taking into consideration the fact that it would be impossible to follow the exact proportions of wool for mixture of different kinds, the working of the material in a wet state causes it to be torn needlessly. There are two factors to be considered in this connection, the effects of which are diametrically opposed to each other. On the one hand, there is the greater elasticity and yielding capacity; and on the other, the far inferior power and strength of the wet fibre in comparison to the dry. Although the first circumstance appears to speak in favor of working wool while wet, this advantage does not counter-balance the loss due to the inferior strength of the wet staple. It is known that wool, both as yarn and as a fabric, tears much more readily in a wet than in a dry condition. The experiment is easily made with strips of cloth, yarn, and wool. Thus it is greatly injured in the picking and carding processes.

The statement is apparently contradicted, by the fact that, in the tearing of shoddy, in order to obtain a longer staple, recourse is had to wetting. But it must be considered that we are here dealing with a wool material more or less felted by spinning, weaving, and fulling, and which must

be rendered elastic again by moistening; otherwise the single interlaced fibres would be torn into short pieces. This, of course, need not be feared in the working of loose wool. It is simply the readier tendency of the stuff to be separated into single fibres in a wet state that contributes to the obtaining of a longer staple in the manipulation of the wet shoddy rags. Analogous considerations also present themselves in the teaseling of the cloth. In this process also the fibre loosens out of the teasled felt, and forms in layers much more easily when the cloth is wet than when dry.

Another factor which is apparently in favor of a wet working is the circumstance that the material to be spun is previously moistened with a lubricant, and that this generally contains a large percentage of water. It is very evident, however, that there is a great difference whether the wool was wet originally,—that is, whether the fibre was saturated with moisture and softened,—or whether it was damped only slightly, and with an oleaginous lubricating fluid. To test this it is only necessary to work off a portion of picked and lubricated wool, one part at once and the other after a few days in order to afford time for the lubricant to penetrate into the fibre and to moisten and soften it. It will then be found that there is a great difference between the lot worked at once and that worked after the lapse of several days—a difference invariably resulting unfavorably to the latter.

Let us consider next the behavior of the wet material in carding. The wet fibre is more easily smoothed and laid parallel, but it will in the course of the carding process, especially towards the end, dry gradually, and become inclined to resume its original position. The preceding smoothing and carding, therefore, was to a corresponding degree useless. Even if this circumstance had but little weight, another and a far greater evil, namely, the unevenness of the yarn, is caused by the gradual and partial drying of the wool during the carding process that follows. No matter how uniformly the wool has been lubricated, the water used in the lubricant will persistently settle downward, and it will invariably be found that in a particular lot, no matter how stored, whether in baskets or in sheets, the lower layer will be more moist than the upper. Again, it is a subject of every day occurrence that during the longer or shorter stoppages taking place in every mill, the material either upon the card rolls or lap drum, etc., will dry out very rapidly. Laps from the first breaker worked for future contingencies will dry out more or less. Under such circumstances it is impossible to produce an even slubbing and even yarn. One of the most natural and frequently occurring consequences of the working of wool in a wet state is the more or less strongly pronounced appearance of cockles in the cloth. The greater weight, together with the greater inclination of the wet material to yield, also causes many inconveniences during the carding process. Heavy laps hang and sag upon the drums, and to a still greater extent upon the so-called lapping apparatus.

If, therefore, the drying of the spinning material is required, the kind of drying employed is another equally important consideration. Drying quickly, and at too great a temperature is to be avoided, because overdried wool becomes rough and brittle, and, by reason of the greater degree of electricity generated in it, it becomes obstinate and cannot be smoothed and easily worked. It is also apt to fly during the process of opening and carding. The effect of electricity on the condenser is particularly annoying. The single wool fibres will jump from one thread to another, and frequently cause the running together of a number of threads. Such electrical phenomena are more frequent and stronger in some kinds of wool than in others, so that as a rule an additional oiling becomes necessary, which should

only be applied to very dry wool. At the same time care must be taken that the wool is permitted to be piled in thin layers only for a short time before it is carded, because the surface will dry out and the oiling be rendered useless. The lower parts also become too wet and soften. A mild drying, either in open air, or, if this is not possible the closest possible imitation of it, thorough ventilation being indispensable, is the only means of securing the good behavior of the wool during the processes of carding and spinning.

It is of great importance, also, that the material should be well cleaned before oiling. Indeed, this is the most important factor in the preparation of the wool for the carding process, if any regard is had for the preservation of the card clothing and production of a smooth, uniform thread. The residues clinging to the wool from the dyehouse must be thoroughly removed. This is best performed by an effective rinsing of the dyed wool. To do this in a perfect manner the wool should be well scoured before dyeing. Badly washed wool is freed from the dye residues with far greater difficulty than if it had been washed clean before. Besides this, it is necessary to rinse the wool well after dyeing. This applies especially to vat blue and to all colors that have been dyed according to old methods—that is, with dyestuffs of the old school, such as madder, camwood, logwood, indigo, etc. The modern dyestuffs, alizarin, etc., are generally absorbed so completely that only a small amount of dye residues remains to be removed.

It is not possible, however, by rinsing the dyed wool, to remove all the impurities it contains, especially if old-school dyestuffs have been used. These can be removed only by thoroughly dusting the wool. This is to be performed before the actual picking after oiling. The machine for this purpose has undergone many improvements recently, and various styles are found on the market.

Important though the operation of the dusting and picking of the wool before oiling and carding is, it is nevertheless performed in a superficial and bungling manner in many spinning mills, greatly to the injury of both machinery and material. In many mills the dry picker is regarded as a superfluous appendage. The idea is entertained that if there is an opener and picker, it cleans the wool sufficiently from dust and dirt. This, however, is not always the case, because the wool generally enters the picker and teaser in an oiled condition, and the dust and dirt have already united in a sticky mass which can no longer be dusted out.

—In the middle ages other things than wool passed back and forth across the Channel, between England and the Netherlands. How it was in the time of Henry VIII. we may learn from the accurate observer, Guicciardini. "To England," he says, "Antwerp sends jewels and precious stones, silver bullion, quicksilver, wrought silks, cloth of gold and silver, gold and silver thread, camblets, grograms, spices, drugs, sugar, cotton, cummin galls, linen, fine and coarse, serges, demi-ostades, tapestry, madder, hops in great quantity, glass, salt fish, . . . arms of all kinds, ammunition for war, and household furniture. From England, Antwerp receives vast quantities of fine and coarse draperies, fringes and other things of that kind to a great value, the finest wool, excellent saffron in small quantities, a great quantity of lead and tin, sheep and rabbit skins without number, and various other sorts of fine peltry and leather, beer, cheese, and other sorts of provisions."

—Success in trade depends on the dexterity with which we can apply the knowledge gained in the textile school to the wants and requirements of that trade.

KNITTING DEPARTMENT.

The Knit Goods Situation.

The general conditions of trade have not greatly changed within a month. There has been felt a slight temporary weakness here and there for which the unseasonable weather was mainly responsible. Strong effort, too, has been made to convince people that the strength of the cotton yarn situation has been exaggerated, but with limited success. In the meantime organization and the scheduling of advances keeps up, while the new knitting mills incorporated during January have a nominal capital which aggregates $600,000.

Should low temperatures prevail and the open winter continue the next few weeks, soft spots are almost sure to develop, but the market will be a purchase on nearly all decided concessions.

Chemnitz advices, are, if possible, stronger in tone than ever. The fact is, other industries there are holding out greater inducements to labor, particularly in the finishing departments, than hosiery manufacturers feel capable of doing. Naturally, one would predict that further advances in wages must be given to hosiery operatives. This would probably be the case if foreign manufacturers were not so far behind on orders. As it is, their deliveries are so slow that a tendency to cancel orders is cropping out. It has not gone far, however.

Chemnitz is going through the same experience on yarns that domestic manufacturers have endured for three or four months. Domestic manufacturers ought to profit somewhat by the present condition of affairs and put themselves in position to further benefit by any extension of such pressure abroad.

Notwithstanding that temperatures thus far this winter have ruled lower than for three decades, the spring season in hosiery was forced fully two weeks by buyers, which furnishes a striking commentary on the confidence underlying general business. Most of the early comers were the shrewdest bargain hunters.

Probably no department is more depressed than golf goods. Manufacturers apparently acted on the principle that the whole country was going golf mad. The situation was realized to be so hopeless a year ago that several of the larger producers withdrew from the field. It was expected this action would so lighten the load that the balloon would speedily rise. The output, however, is still too large and more sacrifices will have to be made.

Spring styles are in better taste than for several years and the tendency of qualities is upward. These improvements show all the more strongly the need of paying more attention to sizes and proportions. Importers are beginning to see the need of decreasing single thread goods, if they are to hold their ground. In short, there is a decided, if not a large turn from low grades, which have been popular only because of their cheapness.

The demand for lace goods remains unabated. Its combination with embroidery is becoming frequent. Extracted patterns in lisle and cotton show no diminution in request.

The underwear outlook is firm and promising. Prices cannot be said to have kept pace with the advances in yarns. The situation is the same abroad, manufacturers not exacting anything like the full advances in wool. Consequently, the run of goods may still be said to be cheap.

Many drummers have already started for their fall orders.

The uniformly strong position of yarn spinners the world over cannot be ignored and warrants their stiff demands at climbing figures.

There is just one great bugaboo—the fear of duplicate orders. This danger is not altogether imaginary, for it is

known that some dealers have placed the same order with two or three concerns, fearing that one source will be insufficient to supply them. It is doubtful, however, if this questionable practice has gone anywhere nearly as far as is alleged. Cancellations, etc., will further reduce the danger, so that general demoralization of prices following pressure to work off stock is only a remote danger.

The reforms being attempted in several small directions are the best indications of the healthy undertone. Among these is the pricing of sizes strictly according to the cost of each.

On the other hand, it must be regretfully noted that certain importers form an exception by reducing qualities to meet conditions that had better been withstood.

Several new schemes are shown in patented cotton and linen effects.

Business is brisk in athletic goods, which, as a class, are sadly lacking in up-to-date introductions in weight and patterns. Mercerized cotton is being tried for light weight sweaters and with some success.

Cost of Making Men's Half-Hose.

There appeared in our January issue an inquiry for information on the cost of making men's half-hose. In our February issue we published a number of letters with valuable information regarding this inquiry, and add to these the following communications from practical manufacturers, which we think cannot be otherwise than of great interest and value to our readers.

Editor Textile World:

The prices paid for knitting, topping, looping are about the same here in the West as in the East, with the exception of knitting. For 160 needle work, we pay 5 cents for knitting, 4 cents for topping, 5 cents for looping and 4 cents for pressing and finishing. We run full automatics, one girl running five machines with two toppers.

D. M.

Editor Textile World:

My idea of cost in manufacturing the goods described in your January and February issue is about as follows:

Cone Yarn, about	.30 cts.
Boss knitter, $2.50 per day, per dozen	5
Knitting, per dozen	4
Knitting and Cutting Tops	¾
Topping	3½
Looping	3½
Rough Mending	1½
Finishing	3
Repairing, Boxing, etc.	1½
Boxes	5
Cases and Cartage	2
Dyeing	8
Needle Breakage and Supplies	3
Fuel, etc.	.10

This does not include office expenses. Charges for knitter, the engineer and office charges will be no greater for 100 dozen than for 50. The location in regard to the supply of help is very important. If a mill is located where there is surplus help, a manufacturer can reduce the cost of his labor several cents a dozen. The great trouble of many small hosiery plants is that the proprietors are not practical men. They hear of some one who has been successful in the knitting business and embark in it. Perhaps they hire a cheap overseer to run the plant, and as the manufacturer knows nothing about it, he cannot tell until he hears from his commission man whether his goods are properly made or not. Unless a man is thoroughly practical himself, the most important thing for him to do is to get some one who is, and then give him a free rein as far as manufacturing is concerned.

FLEET.

Editor Textile World:

I read, with much interest, the correspondence that has been published on this subject.

To keep the cost of making half hose on ¾ automatic machines down to the lowest minimum, 2 cylinders are necessary to each knitter (footer)

and the price of a good knitting machine of the ¾ make I hardly think could be bought for less than $110 each (2 cylinders included).

The price of the press is about right, but the best makes of dryers are from $10 to $15 higher.

In proper hands the working capital as given ($2990) is ample. You can cut $1000 off and still have enough. The capital can be turned eight times in a year.

Not including cities in Pennsylvania, the price given for knitting, topping and looping is a little high. A good half cent can be taken from the price of boxes, bands, etc., also a good half cent from the cases, freight and cartage, and another good half cent from waste, etc.

Under ordinary good management, 12 knitting machines should produce, instead of 50 dozen, not less than 60 dozen, while 65 dozen would be nearer right.

Our goods are light in weight and especially so in the 188-needle goods, and therefore a machine will not turn out as many socks as in cases where they weigh, say 1½ pounds to the dozen, yet our average per machine on automatics on the 160-needle goods machines is a little better than 5½ dozen to the machine, and there is but one reason why we do not average 6 dozen to the machine, viz., we have to educate all of our help, and the poorer knitters are put on the 160 machines. However, we have one knitter who averages 6½ dozen to a machine, and another 6 dozen, not including Saturdays (short day). Of course 6½ dozen is top notch.

The speed of our machines is 240, and this is considered to be a slow speed. 260 is not too fast. I would have my machines run at the latter speed, but in running my plant, I am governed by conditions as far as I can see them.

Three ribbers are necessary for 12 knitters, and while they are more than enough, 2 will not do the work.

In my judgment, above all things, 3 loopers are necessary. Two good loopers (girls) can loop 80 dozen, and from this it would seem that 2 looping machines were plenty, and while you can say you do not need the third, if it were my case, I would surely say, "but I want a third looper." I always have from 1 to 3 looping machines standing idle and likewise always have some other hand in the mill who can loop, and sometimes 2 and 3 of them whose regular work is something else. The result is I am seldom, if ever, back in my looping, and might say, have never had any trouble with my loopers. By this I don't mean to say that I can't have, far from it, but there is less danger. The looper's defiant spirit is, as it were, held in check, and while this extra looping machine or two may be a sort of thorn to the looping girls, it's a peach just the same to the foreman or proprietor.

N. J.

To Make Tubular Goods.

An improvement in circular knitting machines has recently been invented, designed for making tubular goods, especially for stockings. Briefly stated, the improvements consist generally in first forming a stocking or tubular fabric having a variety of colors and regulating at will a predetermined number of courses of any colored thread and providing for any desired combination of color; second, adding a reinforcing thread at the desired point in the formation of the fabric where the reinforced thread is used only in a portion of the course and yet maintaining the tension of the thread at all points of the course substantially uniform, and, third, removing the reinforcing thread of the heel and toe at the desired point when its desired action is completed and bringing it into action again at the desired point.

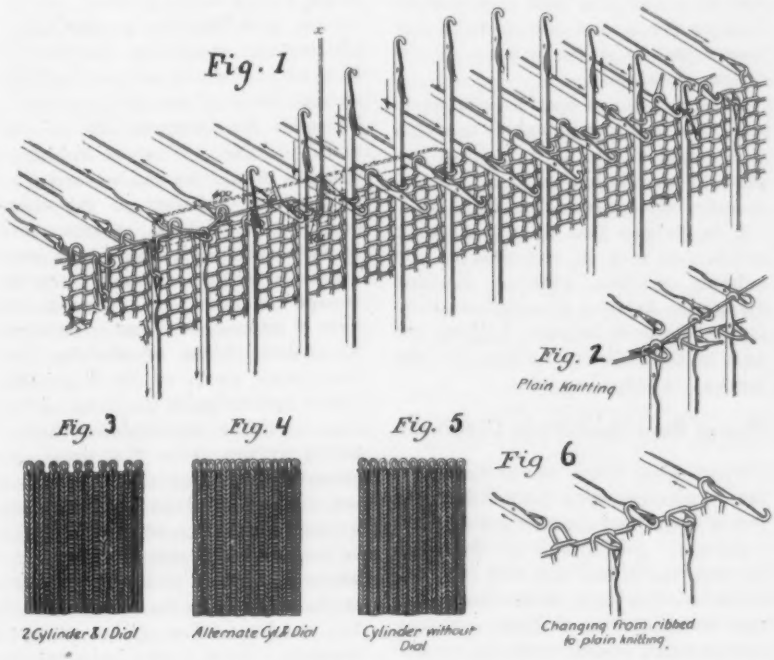
—Silk calculations must be very formidable when they require a book. Silk is composed of the most irregular of threads.

A New Thing in Knitting.

We herewith illustrate newly devised knitting operations of a mechanism for acting the horizontal needles, otherwise known as the dial-needles, which co-operate with the circular series of vertical cylinder needles, for producing a ribbed fabric.

In order that an idea may be had of the knitting operations, we give a diagrammatic view (Fig. 1) of dial and cylinder needles in action, showing the method of knitting the ribbed fabric; also, a representation (Fig. 2) of a group of cylinder needles in action, taking the thread and forming a plain fabric; a ribbed fabric (Fig. 3), produced by cylinder and dial needles, arranged in alternation of two cylinder needles to one dial needle; a piece of ribbed fabric (Fig. 4), produced by cylinder and dial needles, arranged alternately, one dial to one cylinder needle; a piece of ribbed fabric (Fig. 5), produced by the cylinder needles only; method (Fig. 6) of changing from ribbed knitting to plain knitting, the fabric being pressed off from the dial needles, and the latter going out of action.

The principal object of the mechanism that effects the knitting of the illustrated fabric is to provide the means which can be automatically brought into and taken out of operation during the knitting of a piece of work which is knit partly in plain knitting and partly in ribbed knitting, and which admits of being reversed during the knitting of the plain portion of the fabric—as, for instance, the heel and toe of a seamless stocking having a ribbed leg. To this end the device known as the "dial-cam cap" is provided with certain fixed cams and pivoted cams adapted to swing between the fixed cams to form an endless, changeable, reversible cam-track, and automatic means are provided for swinging one of said pivoted cams into position to thrust and retract the horizontal needles at a point adjacent to the yarn-carrier for taking on yarn and carrying on the knitting operations, and automatic means



are also provided for swinging the other pivoted cam into position to form a cam-tract adapted to thrust and retract the horizontal needles at a point away from the yarn-carrier for entirely casting off the work from the dial-needles, in order that the knitting may be continued on the cylinder-needles for knitting the plain part of the fabric. Automatic means are also provided for swinging the pivoted knitting-cam outward a partial stroke for the mere purpose of taking yarn, and then swinging said cam inward to cause the needles to form loops and permit the loops to be filled by the cylinder-needles.

This mechanism may be applied to any circular-knitting machine to which it is adapted. It is preferably applied to what is known as a "full automatic seamless-stocking machine."

It is claimed that the dial knitting mechanism may be embodied in any suitable cylinder knitting machine during the knitting of seamless stockings. The parts in plain knitting are knit in the ordinary manner, by the vertical cylinder needles.

Wanted More Elasticity in Underwear.

First, what is the use of making a better garment than your competitor if you cannot get a better price for it?

Answer. As there is no difference in price the public will buy only the better one; so that, while the profits may be smaller on a single sale they will be much greater in the aggregate.

Second. How can you get the public to know your make is the best?

Answer. If both articles are brought prominently before the public both are certain to be tried, and the public will very quickly pass judgment on them and use only the better one.

Elasticity as wanted, the method of producing knitted underwear by a system of looping yarns or threads together, as is done on the knitting frame, has a special advantage over all other methods, making it the one universally adopted for underwear of all classes. The elasticity of a knitted garment is its special feature. Therefore it is necessary in all the processes through which the fabric passes that none of its elasticity shall in the slightest degree be injured. But I am free to say that such attention is not paid to this part as its importance demands; for a large percentage of our best and high priced goods have not the elasticity they should possess. The cause of such is chiefly in the knitting, although there are others, which I shall notice later.

First, in the knitting process proper, the threads should be formed into such loops that the greatest uniformity and stability can be had, and at the same time maintain all the elasticity possible. What is known as stiffness in knitting can be carried too far, to the detriment of the elastic quality of the goods. A safe course to pursue when starting a high grade article is to knit a small piece, say enough for one or two garments, and have it seamed, etc., and put through the regular course of washing, with some other goods of the same style. Put a special mark on them so they may be easily distinguished; remembering at this point that great care should be exercised and the garment not unduly stretched onto too large drying forms. The effect if such may be easily seen by comparing with garments that are all O. K. For if undue strain is put upon the garment it will lose the greater part, if not all, of its elasticity. So it is very essential that garments should not be stretched or boarded beyond there normal width; for where this is done the elasticity cannot be attained.

It occasionally happens a width is required that is beyond the normal width of the fabric, and to obtain this the fabric must suffer by being boarded on a larger form. This, however, should never be done if it can be helped, for the elasticity will be injured.

The elasticity of the garments may suffer from excessive washing or milling which should be avoided, for when

this is the case, neither the width nor the elasticity can be obtained. It is necessary a washerman should understand his business properly, for one bad milling if not kept separate from the better goods, will cause trouble ahead, and the manufacturer may not know of it until he hears from the trade.

I will cite a case in the city of Boston a short time ago, when I was in Jordan & Marsh's large establishment. A lady came in to purchase two suits of the best all-wool underwear, full fashioned, for her husband. She was wide-awake, knowing what she wanted. After a careful examination she rejected our American goods, and purchased foreign goods, on account of their elasticity. This simple transaction showed me how careful our manufacturers should be, not to injure the elasticity especially in our highest priced goods, for if goods are stretched beyond their normal width, against the nature of the fibre, the principle of contraction is such that it cannot be done without detriment to the garment.

These remarks apply to all wool, or ninety per cent. goods. If the washerman understands the method of treating woolen goods with a small percentage of chlorine it will prevent the goods from felting. Should the garment get felted, its elasticity is greatly impaired. If too much chlorine is used on white goods it will give them a dingy yellow shade, and a harsh feel.

The knitter should be able to understand the quality and nature of wool, also the amount of twist required in the yarn to make a good elastic fabric. If the wool is of a wiry nature, it requires less twist, if soft and fine, the yarn requires more twist.

If strict attention is paid to the above remarks, more of our best and highest grades of goods will be used, and good prices secured, with a good margin left to the manufacturer.

It appears to be almost the unanimous opinion of men who have had the responsibility of large textile plants, that, whenever a troublesome affair is encountered, the overseers, through whose departments the damaged, or defective goods pass, endeavor to throw the odium of the blame on to some one else. Seldom is a man found who openly and fearlessly comes out and acknowledges that an error has been committed by any one under him and for whose bad work he or she is responsible.

I do not write this to throw any suspicion upon knitters, washermen, or any others, for it is quite probable that in none other of our great textile industries, are men better qualified to be found, or more intelligent, but the fact above recited remains. The writer therefore offers a few timely suggestions to the manufacturers, that, if strictly adhered to, will be of great benefit to them, so John Doe may not have it to say, this and so did not occur in his department, but must have happened in some other.

First, the stock should be number one; second, a low or cheap grade of oil should never be used, for right here, oftentimes, a serious blunder is made which cannot be rectified easily, for on medium and good grades of stock, no mineral oils should be used, no matter who else uses it. If other manufacturers wish to oil their stock with such oil let them. Let me say, nearly all the oils of late contain more or less mineral matter, a substance which no doubt makes a good lubricant on some grades of stock, but which is extremely difficult to remove with satisfaction to all concerned. The prime object in oiling wool is to lubricate it, so it may card, spin and knit well. After all, this, when the garments are made and go to the washerman, must be removed. If it is a good and easily saponifiable oil, not much if any harm will follow, and the elasticity of the garment will not be injured in the least, if proper care has been used. But if mineral oil has been freely used, no amount of scouring will remove it without killing the elasticity in the garment.

In the former case, a light soap bath of neutral soap will answer admirably, leaving the garments in a soft and elastic condition. But in the case of a mineral oil, a vigorous treatment has oftentimes to be resorted to, with an overcharge of soap and soda, leaving the garments in a bad condition, and destruction of elasticity in the garments. Elasticity is of extreme importance. Scouring mixtures are of great benefit when properly made, and should not exceed a certain reasonable proportion of soda. I have seen solutions made up so strong with alkali that the soap would not dissolve, but float on the surface as ice will on the top of water. The object of such a strong scouring bath is for the purpose of eradicating the effect of the mineral oil on the goods.

I say freely, there are too many mixtures and scouring compounds on the market today, which are offered to manufacturers at tempting prices. Oftentimes recourse is had to the old method of soap, soda or other alkali. As a matter of fact, soap made nearly as neutral as possible, from good stock oil or tallow, and strengthened only as occasion requires with soda crystals not ash, cannot be very well bettered if attended to intelligently. Seldom, if ever, any complaints will arise in the washing department if this is followed. A cheap grade of goods may use a cheap oil soap and to some good advantage, but the above is written solely as a warning to manufacturers who are making or trying to make, an A1 article, and a reputation for themselves. Of late, three different parties who are making high priced underwear, wrote me about their trouble, and sent me goods to examine. I discovered where it was, after the nature as stated above.

This is of extreme importance to manufacturers. I came in contact the past season more than ever before, with troubles of this character. Certain soaps cause a heavy precipitate which are not only a pecuniary loss to the manufacturers, but are injurious to the elasticity of the fabric, and largely responsible for the spotted effects when goods are dyed, unless they are very carefully rinsed after washing. This is something for dyers to think of.

Elasticity in underwear must not be destroyed. The object of the scouring of knit underwear is, of course, the same as that of loose wool, yarn, or any textile fabric, that is, the removal of all impurities. The substance present as impurities depends greatly upon the character of the article. If it has been dyed in the condition of loose wool, the garments will contain the oil added before carding; also any dirt contracted during the process of manufacturing. In the gray or undyed, both grease and dirt will be present. If the yarn has been dyed and scoured previous to being knit, very little dirt will gather in the course of knitting, looping, seaming, etc., if proper care is exercised in these processes. The method of scouring should therefore depend upon the nature of the impurities, the character of the goods, and the coloring matter with which the wool or yarn has been dyed. This is of considerable importance, for the elasticity of the garments.

Gray goods (wool carded, spun and knit in an undyed condition), will contain grease as the principal impurity, and may be scoured either with pure soap or soda, or a mixture of both. In the case of certain grades of goods, which have a tendency to shrink in scouring, the utmost care must be exercised or else the elasticity will be destroyed. In the case of wool or yarn being dyed, the scouring process should be conducted so the elasticity of the garment is not injured.

Wool felted, or shrunk in scouring is very injurious to the staple and the elasticity of the goods, leaving the yarn in a dead state, with no stretch or elasticity to it, and the best of knitters will fail to produce the elasticity required. The carder and

spinner may do their best, and it will not avail, for wool, if felted, kills the elasticity, no matter whether the yarn is twisted soft, medium or hard. When the wool is all O. K., the best results will be obtained from a medium twist, producing a beautiful elastic garment, providing the knitting is also O. K.

It is a fact, not generally understood by washermen, that chlorine has the effect of preventing wool from felting. It would, therefore, presumably, prevent wool fabrics from shrinking, for it is the mechanical felting properties of wool that bring about the shrinkage during the scouring operation. A formula which I give may aid a struggling washerman in his labor to retain the elasticity in the goods if properly used. Take, for 10 dozen of goods, weighing 125 lbs., or goods that are to weigh 12 lbs. when finished, which is sufficient for one milling, 3 lbs. of bleaching powder with water sufficient to cover, stirring freely with a wooden paddle or pole until the same is mixed properly in a good clean tank. Then immerse the goods rapidly in this bath. After remaining from 10 to 12 minutes, they are taken out, put into a bath of hydrochloric acid of 2°, and kept there for 8 to 10 minutes. Take them out and thoroughly wash. It is not advisable to use any more bleaching powder than given, otherwise the goods, if white, will be yellowish in color, and have a harsh feel. The trouble with many washermen is that they are still working in the old rut of five or ten year ago, and don't think of trying to improve, until by circumstances are compelled to.

I discovered this very forcibly the past season, at a place where I was called to give instruction. The washerman in charge had been there nine years, failing to improve on a fine line of goods. He was using a very poor grade of soap, which is the principal agent employed in scouring. It is so liable to adulteration that a thorough knowledge of its composition and manufacture is of great utility. There are, of course, various substitutes in the market to use in conjunction with it, but these oftentimes have an injurious effect on the fibres of the wool. They are extensively used in cheap soaps, and were it not for their cheapness, would be discarded altogether.

On the whole, nothing is so satisfactory to cleanse first-class woolen underwear, than a pure unadulterated soap, and if proper care be taken, the elasticity will not be injured, and the garments will feel nice and soft.

An A1 garment made of two extra fine threads, run in together (not doubled and twisted) will make a beautiful, durable, elastic garment that will be noticeable for firmness and elasticity for athletes, equestrians, etc.

It is not necessary, or desirable, far less advisable to use all wool, for a better article may be made with a small percentage of sea island, or a high grade of long stapled cotton, from 2½ to 5%, no more.

A. SCOTLAND.

—The superiority of one manufacturer over another is due to the greater care and attention bestowed upon the manipulation of the material by the one than the other; to his superior arrangements for securing cleanliness, to particularity, to intelligent and skilful management of the operatives resulting in a friendly interest among all concerned; to his greater energy and enterprise, and also to the scientific laying out of the machinery to produce the best results in both quality, quantity and economy.

—In the direction and regulation of the affairs of a manufacturing establishment there is not any one thing or any combination of things, of more vital importance than system and discipline.

—Technical instruction is the backbone of technical knowledge, and the so-called rule of thumb has passed out of existence.

SILK DEPARTMENT.

Raw Silk.

E. F. FREUND.

Silk is the only fibre or material which in its natural state forms a thread long enough to be used for weaving without having to undergo the process of spinning. It is also more than likely that it was the first material ever used for weaving, its use in China having been traced back to about 2000 B. C.

Silk is a fine, lustrous thread of smooth and solid structure, produced by the worm of the silk moth or "mulberry spinner" (Bombyx mori), and used by the same for the purpose of enveloping itself into a solid oval shaped structure, known as the cocoon. It is wrong to call the "silk moth" in its early state of development a worm, a word commonly used by English speaking people, and conveying an absolutely wrong idea. The silk worm is a caterpillar—better still a larva—a much superior creature than a common worm. A few eggs of the Brombyx mori were brought to Constantinople during the 6th century, and thence dates their very slow introduction into the southern countries of Europe.

The story that two monks smuggled the first eggs out of China (their export being prohibited) in hollowed-out canes and presented them to the Pope is very romantic, but can not be believed when we consider how long such a journey must have taken them and what infinite care and attention those eggs would have required, and which it would have been impossible to dispense within the narrow limits of the inside of a stick of wood.

Not until the 12th century, the silk worm (we will call it so because of its popular usage) found its way into Italy and in the 15th century into Spain, the only reason for this slow spread being the scarcity of mulberry trees.

The female moth lays about 400 eggs of a pale bluish-gray color and such diminutive size that, according to estimates, it would take over 700,000 to make a pound. The eggs are left during the winter in rooms of a medium cool temperature and are not "incubated" till spring or until the mulberry tree commences to put on a newly green dress.

For the purpose of hatching, the eggs are deposited on sheets of paper, then brought into a warm room and covered with other sheets which are finely perforated. After seven or eight days finely chopped young mulberry tree leaves are scattered over the covering papers so the young worms, when they leave the eggs and climb through the perforations in the paper to the light of day, may find their food not only ready, but of the best and most appetizing quality.

After all the worms have come to the surface, the papers are taken into other rooms, where the worms have to undergo a physical development lasting 33 days. In this short space of time the worms shed their skins five times, namely after 5, 10, 16, 22 and 33 days, thus dividing their short lives into 5 periods, during each of which we have to give them more room and more food.

Eight or ten days after the last change of dress, the worm gets tired of life and commences to spin his own house, wherein to live in retirement until he may emerge into the world again, this time a moth. Yet of the millions and millions of worms bred annually, but a very small percentage is destined to reach that state.

In order to aid the worm in spinning his cocoon, straw and small twigs are given them, for use as "footholds" in the process which now commences. The worm first forms a loose, transparent, coarse and parchment-like cover, and after that a dense, almost egg-shaped weave—the cocoon. The length of thread of which the cocoon consists is various-

ly estimated to be from 4000 to 5000 yards long. From this length only about 500 yards are used, as it is impossible to reel off the first loose and coarse web, nor the inmost parchment-like looking covering of the larva. The cocoon is about one inch long and from ½ to ¾ inches wide. The thickness of the wall forming the cocoon is about that of a playing card.

Inside the cocoon the worm undergoes the transition into a brown larva out of which again, in two or three weeks, the moth develops. By first wetting, then softening, and finally perforating the cocoon, the moth opens a way for its own egress.

After its escape from the cocoon, the female lays its eggs and both sexes die shortly afterward. Only so many moths are permitted to reach that stage of the game, as are necessary for breeding purposes, thereby calculating that a pair of moths will ultimately produce 300 worms. Experts have no difficulty in distinguishing between male and female cocoons.

The raising of silkworms requires infinite care and attention, also an experience which has come down from generation to generation during centuries, and usually remaining in the family, all members of which are actively engaged in the culture. All attempts to raise them in the United States on a paying basis have failed thus far, a failure which possibly may have largely been due to the inexperience of those connected with the various enterprises. When we consider the extent of our country and of the different climatic conditions existing therein, it does seem strange that there should not be a large area wherein the silkworm could be raised successfully, if the necessary experience and care were employed.

The silkworm is susceptible to diseases, which, if not immediately recognized and exterminated by "quarantining," are liable to break out into epidemics, and within 24 hours may wipe out of existence all the worms of an establishment.

The chrysalis inside all such cocoons as are intended for the production of silk are killed by either roasting them for two or three hours at a temperature of 100° to 120° F., or steaming them for from 10 to 15 minutes. As soon as the heat enters the cocoons a peculiar cracking noise is heard denoting the killing of the larva. The employment of steam, while shorter and more convenient, has such disadvantages as the bursting of cocoons and making them sticky, and consequently more difficult to reel off. It is therefore not used very often.

To get an even quality of silk off the cocoons, these have to be sorted as to their color, fineness of thread, quality, imperfections, etc. After being sorted the best qualities are used for making organzine, whereas the inferior ones (though perfect) furnish material for tram. Soiled, perforated, not quite finished cocoons, and such wherein two worms have made their home, are separated from the others, and used for the manufacture of chappe (spun) and sewing silk.

The natural color of the silk thread is white, the yellow color of some silk being due to a gum-like substance covering the thread, which can be easily boiled off. Under the microscope the silk thread coming off the cocoons consists really of two threads slightly twisted around each other. The thread is perfectly smooth and without structure—glass-like. Sulphuric acid dissolves it immediately, and copper oxide ammonia will swell it into a pale bluish jelly. The susceptibility to disease and climatic conditions of the worm of the Bombyx mori has led to many experiments with the worms of other kinds of moths, but with very indifferent results. Among those tried is the "Tussah" worm, living on a certain kind of oak in Europe, which is the only kind used today, all others having proved entire failures.

The fineness or size of the silk thread is expressed by a number, which is called titre (French), or titolo (Italian). This titre tells us how

many units of a certain weight (denier) a skein of a certain length will weigh. Several kinds of deniers are in use in Europe at the present date, although the international denier is rapidly taking the place of all others. Some of the deniers, as compared to the international one, are given below, more for curiosity's sake than for any practical use they may be to the reader. The Congress on the Uniform Numbering of Yarns, to meet next year in Paris, and at which it is reported all Continental filatures will be presented, will doubtless abolish all but the international denier.

	Weight. *Mlgs.*	Length of Skein. *Meters.*
1. One denier (or denari legale)	0.05	450
2. One denier milano	0.051	476
3. One denier turino	0.0534	476
4. One old denier Lyonese	0.0531	476
5. One new denier Lyonese	0.0531	500
6. One denier internationale	0.05	500

We indicated above that a denier was the unit of a certain weight. Speaking of the Denari legale, for instance, this would mean that a silk of 18/20 deniers would be of just such a size that a skein of 450 meters would weigh from 18 to 20 deniers, or 19 times (average) the unit of a weight equal to 0.05 mlg. Thus while a denier is nothing but a weight pure and simple, yet it bears relationship to a certain length, which again depends upon the kind of denier meant. The titre is expressed in the shape of a fraction (18/20 or 24/26), because it is impossible that all skeins contained in a bale should be of exactly the same size, and therefore it is necessary to give the finest as well as the coarsest titre that might be in a bale. Not so many years back nothing was thought of having the silk in one bale run from 16 to 20, for instance (16/20 or 24/28), but with the rapid improvements in filature during the last few years this would now be considered a poor quality of silk (because uneven).

In determining the size of silk, 25 to 30 skeins are taken out of a bale and each one weighed and measured in order to get a fair average of size.

Silk is very susceptible to moisture and will absorb as much as 30 per cent. (without feeling damp the least bit) and just as easily releasing that moisture in dry weather. In as changeable a climate as ours we may safely weigh the same bale of silk on every day of a year and not have two weights alike. This peculiarity of silk has led to the establishment of conditioning houses which make a business to ascertain the absolute dry weight of any bale of silk sent them for that purpose. The working of these conditioning houses has been explained in these columns a few months back and now it need only be said that, while in Europe hardly a bale is sold or bought without a certificate from one of those establishments, the only conditioning house in the United States, though fully equipped with all the latest appliances and under able management, seems to have a hard struggle of it.

The qualities of silk produced by the Bombyx mori differ greatly and do not alone depend upon the efforts of the worm. Much depends upon the qualities of the mulberry leaves on which the worm is fed, on the general care given it, and on the skill with which the silk is subjected in the filature—the process which converts it from the cocoon into marketable shape. While the best quality of silk is raised in China, yet the filature there is so inferior that only in a few instances, and then at a very high price, are extra fine silks obtainable. Italy's and Japan's products are the best, the first being preferable where evenness of thread, and the latter where strength, is the chief feature desired.

Yellow Italian silk is excellent for blacks, whereas nile green Japan is the best silk to use for white and light shades. Fair elasticity is invariably a sign of good silk, provided it is clean and free from dirt and lumps. As a rule it does not take much expertness to tell good from bad silk, yet sometimes a silk will make a very good appearance and turn out to be bad. In this case we may be sure to find the cause in the incompetent

handling of the silk while in the filature. There is nothing manufactured in this world which requires so much patience, care, skill and study as silk, from the egg (or from the planting and caring of the mulberry trees) to the complete dress or ribbon. And yet how few people think of that when they haggle over a few cents for a piece of work that it has taken years to mature and construct, and which had to go through hundreds of hands before it could be placed into the dressmaker's or milliner's hands.

Broad Silk Weaving.

(Continued from February.)

We will, before considering the different fabrics, continue with our loom, it being desirable to prepare for figured goods of, say, from ½ to 3-inch figures. We remove our dobby and substitute a 600-hook jacquard machine. The "gantre" on which our dobby stood, is probably too low, and of too light construction; and assuming that we have a number of looms on which we propose to use a jacquard shedding motion, we arrange our jacquard gantres to cover a number of looms.

There are several methods for supporting the gantres, the principal one being to suspend them from overhead, either longitudinally or crosswise with the looms. If the latter, an extended U shaper frame, attached to each end of each loom; if narrow looms, at opposite ends of every other loom. On the forks of the frame, the beams of the gantres are secured, in some instances of equal width with the jacquard, and in other instances, cross pieces on which the jacquard rests. A good plan is to place in the beams four screws, T-shaped bolts; securing to these bolts short beams on which the jacquard can rest. This arrangement proves of great service in enabling the same harness to be used over again when the couplings are worn out, by lowering the machines and tying on new couplings. In selecting a jacquard, we may be guided by our financial ability and probable run of goods we are about to make.

A jacquard can very easily be rendered troublesome and expensive by unskilled handling, while, if care is given to the details of its several parts in their operation and functions, no trouble need be contemplated or encountered.

A jacquard machine of 600 hooks will have 612 or 624 hooks between the cylinder pegs; 25 rows of 12 each in one half, and 26 rows of 12 each in the other half, total, 612. The same jacquard can equally as well have 26 rows in each half, and it is always preferable to have a machine 26 by 26 rows, and to cut the cards therefor to take in that number, for reasons which will be hereafter specified. It is also advantageous to have provided outside the pegs of the cylinder 12 or 24 hooks at each end. The ordinary jacquard, single lift, raises the warp from the bottom. Another style of double lift separates the warp from the centre. Another style, open shed, causes a warp thread that requires to be raised any number of times, say seven for a satin, to be held raised for seven picks. Another style has a separate cylinder motion, and another style has a circular cylinder. There are desirable features in each one of these, but for our purpose we will adopt an ordinary single-lift jacquard, and figure on using 576 hooks for our patterns.

We arrange our card race and levers to connect with the loom. For our harness, we may give the order to one of the numerous firms engaged in the business, or engage a harness builder.

The goods we are likely to run chiefly on are partly single scale and partly double scale of different counts; but the patterns are such as to be woven on the stated number of hooks. In both cases, the warp of the double scale require one-third more threads than in the single scale, or, say, 4000 single, 6000 double scale, each 21 inches wide, which approximate 190 and 286 threads to the inch.

The repeat in the single scale would be 3 inches, and in the double each 4 inches, enabling a figure at 3 inches wide single, and 4 inches double scale to be made.

Having ordered our harness, we order designs and cards for a selected pattern from sketch, or sample, for 576 hooks, 190 warp threads, and, say, 90 picks to the inch, single scale; and for 576 hooks, 285 warp threads and 86 picks to the inch. Having our harness built, warp entered, and our cards, we proceed to weave.

In starting up a jacquard job, a little extra attention is preferable to hasty action. A liberal supply of powdered chalk or whitening to the comber board is often essential for good effects. The harness should be low enough to rest nicely on the lay when the shed is open and some cloth is woven. As we may have some heavy lifting in some parts of our pattern, we will use a rod on the cloth somewhat the same as a roller temple, which will prevent the warp from being raised too high from the lay during the heavy lift. While we could allow the warp to rest on the lay and dispense with the rod in the light lifts, the warp would be too low for good results.

Before putting the pattern cards on the jacquard, a good plan is to put four tabby cards on, and turn the loom over by hand to see that the hooks are all working, and that the shed is properly formed. Then throw the shuttle across by hand several picks, catching the filling at each side. Repeat this for a few picks, then weave an inch or so slowly; wind up about ¼ inch, weave 3 or 4 picks, slack the take-up motion, and jam the 3 or 4 picks against the previous woven cloth. This action will draw tight all the loose warp threads, and may be repeated several times. Weave from 6 inches to a foot, stopping occasionally to find any mistakes or faults. If a filling of direct contrast of color of warp is used, every defect will be discernible. When satisfied that everything is all right, put the pattern cards on, and weave them over, looking for defects in the cards or harness. See that the right pinion wheel is on, and that the right filling is obtained. The weaver can then go ahead with the order.

For the double scale job, more preliminary work is required, and, generally, more difficulty experienced in starting the loom; the extra harness involved requiring more manipulation to get in thorough working order. The shafts for the harness are placed in the loops of the harness, immediately under the jacquard, and are tied to the 1st and 2d, and 51st and 52d rows of the jacquard.

To start these jobs, and to easily discover any mistakes that may have been made, tabby cards cut to raise the shafts only, and a short length woven, and tabby cards cut to miss the shafts, but raise the harness, and a short length woven, before putting on the pattern cards, will prove of much assistance.

We have now got the means on our loom to weave any likely pattern that may be required of one color of filling; and should the jacquard work become undesirable for a time, we can tie our lingoes together, put them in a box, and tie the box to the "gantre," using our loom for plain work again.

During the month of November, 1899, there was thrown on the market, that is, withdrawn from the warehouse, $838,000 worth of goods, representing five weeks' importations, that we could have manufactured on looms like the one we are supposedly weaving with.

To have our facilities extended so as to be prepared to weave fabrics requiring several colors of filling, we must have box looms, or a means of attaching boxes to our loom, though we can make checks, changing the shuttle by hand, and giving the weaver the benefit of the extra price. On certain goods, box looms are preferable.

The cost of adding a box motion capable of operating two shuttles, pick and pick, or irregular, or of add-

ing a box motion to weave stripes of various magnitude is not very great. But the consideration lies more in the successful operation of the box mechanism for an extended time. Therefore, unless there is some good reason otherwise, the much better plan would be to obtain looms of known ability.

In starting a box loom the pattern chain may be termed the index, and if some designating mark is placed on the chain to mark the starting of the pattern, many weavers would be greatly assisted.

For the successful operation of the box looms, shuttles of similar size and weight are desirable. Driving the shuttles hard, and using tight binders, will cause a loom to run successfully for a time; but if a constant and steady power is used, a free, swinging pick, easy binders, nice rebound of picking stick, will result in a better and more continual operation of the loom.

JOHN C. BROOKS.

Broad Silk Shuttles.

Shuttles for broad power looms for silk are of a construction suitable to the fabric being woven. For silk, it has been, and in many instances is, customary to have small shuttles and intricate tension mechanism; but with the rapid advancement in the art, the use of larger and simpler shuttles is becoming quite common.

With the improved shedding mechanism many goods can be made that formerly were considered impossible without the use of bows fixed on the shuttle, though bows are still used with advantage.

The elasticity of silk and its tenderness, calls for certain consideration in transferring it from the quill into the cloth. While a nice, even drag is required at all times, in many cases an arrangement is desired to take up the slack as the shuttle is boxed and as the lay approaches the cloth. For this purpose, a small lever is arranged on a pivot in the shuttle, and on the lever is a series of rings, which pass between a series of pins secured in the shuttle. The filling is led through the rings and outside the pins, so that when the filling is slackened through any cause, the rings will fall between the pins, drawing in the slack filling, a small elastic band being secured on the heel of the lever to act as a spring.

For other classes of fabric, and on some makes of looms, where it is desirable that the filling shall be laid as near the cloth as possible, a bow is arranged on front of the shuttle, through the centre of which the filling is led between a double set of rings, arranged on levers, similar to the one described above. This arrangement for certain descriptions of fabrics, is necessary for producing perfect goods.

For jacquard goods, a lining of seal skin, or rabbit fur, to form a kind of nest, in which the quill can lie, and a small tuft, placed in the eye of the shuttle, will generally prove a sufficient drag on the filling, and enable perfect goods to be made.

On the true running of the shuttle depends the producing capacity of the loom. The sometimes undiscernible abrasion will split the threads of the warp: long wear will cause rough and sharp edges on the bottom opening of the shuttle; and the constant engaging of shuttle and pickers will affect the joint between the tip and body of the shuttle—all features to be considered in the manufacture of silk shuttles. The latest device is to insert a brass bush, or ring, between the steel tip and the shuttle.

Drop box loom shuttles are generally of a slightly differing shape to single box loom shuttles, and are subject to more destructive wear, and, unless made of good, well-chosen material, are soon worn out.

Silk, when drawn rapidly from off the quill, has a tendency to fly, and at the end of the quill has a greater drag upon it than at the starting point. The fur, for this reason, is generally clipped short towards the back end of the tongue, and the

tongue is kept absolutely centred in the shuttle, the corners of the skin being rounded, and all unevenness removed, to avoid the filling plucking the edges of the cloth. The shuttle eyes often require attention and replacing. Occasionally they become so loose as to be affected by the throwing of the shuttle, or cracked so as to catch the filling every once in awhile.

In the matter of mill supplies, shuttles prove quite an item. False economy in the purchasing often results in loss. An inferior and cheap shuttle may often be made to last as long as a more expensive one, but the vexation of mind and loss in production, besides damages from defective shuttles, far more than offset the little saving in first cost.

SILK.

Food of the Silkworm.

The natural food of the silkworm is the leaf of the mulberry tree, and of the variety that, botanically known as Morus alba, coming originally from China and now well known in Italy—in fact, throughout Southern Europe—is said, on account of certain properties it possesses, to produce the best silk and to grow the strongest worms. The variety known as Morus nigra, once well known to the Romans and cultivated for its fruit, is now neglected, the first-mentioned being the favorite for the reasons stated, besides being the more prolific.

The mulberry trees in Northern Italy are generally planted in rows through the fields, like well-arranged fruit orchards, but with more space perhaps between the trees, so as to give plenty of room for harvesting the crops. In order that the leaves may be tender, the trees are cut until they look deformed, with their big trunks tasseled at the top. Amidst the luxuriant foliage of the surrounding trees and the rich verdure of the fields, the mulberry orchards, after the peasants have been through them and gathered the leaves for the silkworms, present a sorry spectacle. But soon new, tender shoots appear, which are to bear the following year leaves for the silkworm; and a great deal depends upon the vigor of these new branches, for if the summer is unfavorable to their growth, the food supply will fall short the next year and the hatching of the seed be curtailed.

The gathering and curing of the mulberry leaves is very carefully done, so that while they are free from all moisture they are still fresh at feeding time. They are brought in on small twigs from the trees, and being stripped from these and every bit of moisture shaken out, are cut more or less fine, according to the age of the worms to be fed, with sharp knives, or with cutters like the old-fashioned hay and fodder cutter of New England.

Silk Worms Climbing to the Wood.

When the worms have finished feeding and are ready to climb to the wood and commence their spinning, they are given suitable branches, put up in tiny hedges around the edges of the tables or platforms and in such divisions that the worms can easily crawl up to make their cocoons, taking care that the hedge is not too thick, for the worms still need plenty of room and air. It is necessary to protect them from the cold for four or five days. When they are once in the wood it usually takes them three days to spin their cocoons, but they are not ready to be detached for some ten or twelve days.

—The end of all government is order; perfect organization contributes to the pride of all; the best and most nearly perfect conditions attainable are when each and every one conscientiously contributes his individual part, so as to produce the most telling and effective whole; no part should be wanting or favored at the expense of any other; a standard must be established to which every one and everything must be deliberately brought and rigorously held; an example must be set to which all must conform.

POWER DEPARTMENT

ELECTRICITY—STEAM—WATER.

What is a Horse-Power Worth?

Abstract of paper read by G. I. Rockwood before the American Society of Mechanical Engineers.

On June 21, 1895, the city of Worcester took for its own use the waters of Kettle Brook, an affluent of the Blackstone River. The Blackstone River is a small stream flowing from Worcester to Providence, R. I., and passing the premises of sixty-seven owners of eighty developed water privileges, besides a few that are not developed. The total of the heads of water at all the privileges amounts to some 827 feet in that short distance. The quantity of water diverted averages throughout the year in the vicinity of 5,500,000 gallons in twenty-four hours.

It proved to be impossible for the city officials and the mill owners to agree by themselves upon a fair compensation for the loss of water at these eighty privileges, so these owners combined their interests and brought suit against the city of Worcester for damages, partly for the loss in one or two cases of mill ponds and entire mill villages, but mainly for the loss of power occasioned to them by the diversion of the water from their mills into the reservoirs of Worcester.

About 1000 horse power for eleven months each year was perhaps the total quantity of power lost, according to the estimates of the hydraulic engineers of both sides. They were not in precise agreement as to the amount, partly because, owing to a peculiarity in the grade of the watershed above the point of taking, they could not agree as to its extent as intended in the Act by which it was taken; but also because of a difficulty in proving the actual depth of the rainfall on this watershed, and because of the possibility (to the legal mind, at any rate) that a given water power, which, in point of fact, was improved by the regulating effect of certain mill ponds situated above it, was not legally worth any more on that account than it would be if they were not in existence, if, as was true, the owner of the power privilege was not also an owner of the said mill ponds. The largest loss of power at any one privilege was about 66 horse power, and the smallest loss was a fraction of one horse power.

The cases were tried before what, in the description, might seem an ideal commission of three judges appointed as a board of arbitration. One was a lawyer experienced in water cases; another was a manufacturer and large user of water power; and the third was a hydraulic engineer. This commission sat during 1898, the trial lasting for some fifty regular days. Scores of witnesses were examined, and each side employed about a dozen eminent mechanical and civil engineers to give expert testimony as to the facts relating to the amount of water taken and power lost, and particularly as to the value of a horse power. The commission has given its opinion, and on June 28, 1899—just four years after the taking—a settlement was effected between the city and the petitioners amounting to $500,000, with interest for four years at 6 per cent. per annum. The exact sum was $615,259.

Unfortunately, the opinion rendered by the commissioners contains nothing of importance to those engineers who have to appraise water-power privileges, and in this respect is unworthy of the importance of the trial and of the opportunity afforded them, at great expense to the public, of elucidating the obscure legal and scientific truths which would have been applicable in the future to similar cases.

Perhaps it should be said, in fairness to the commissioners, that it is unusual for such a tribunal to give out the reasons for its findings. Boards of arbitration must follow and merely apply, but not create, the law as defined in the decisions of the regular courts. All engineers, however, will find the evidence introduced by the expert witnesses on both sides of the utmost interest and importance. The occasion for this paper is found in the fact that it was possible, even at this day, for the counsel for each party to the trial—the petitioners for damages and the city of Worcester, each acting on the advice of its expert engineers—to take diametrically opposite views of the true way to estimate the value of the power lost by the diversion. The lack of agreement was fundamental. The two theories cannot be reconciled; yet they were advanced with entire confidence and unanimity, each by its own adherents. Throughout the taking of testimony, the delivery of the arguments, and, as far as one can see, in the decision itself—which was a blind compromise—both parties succeeded in maintaining their original positions, and doubtless were sincere in doing so.

The names of the men who testified to the value of power are, for the most part, to be found in the roster either of this society or of its sister society of civil engineers, and are a guarantee of their fitness as expert witnesses. Among them are to be found:—

For the petitioners: Charles A. Allen, C. E.; T. Herbert Shedd, C. E.; J. M. Whitham, M. E.; William Kent, M. E.; Charles R. Makepiece, M. E.; and Samuel M. Green, M. E.

For the defendant: Desmond Fitzgerald, C. E.; Samuel M. Gray, C. E.; Francis W. Dean, M. E.; Charles T. Main, M. E.; Professor James E. Denton, M. E.; and Stephen Greene, M. E.

Let us follow in brief outline the course of reasoning adopted by the petitioners in these suits. Their chief syllogism, divested of all its refinements, was as follows:—

(1) A horse power is a piece of property (a commodity) which may be considered as "on the market," and hence as having a definite market value, known to those who deal in it.

(2) The owner of each of the 80 privileges has lost forever by the act of the city a certain definite number of horse powers.

(3) The financial injury done this owner, therefore, may be found by simply multiplying the market value of one-horse power by the number taken from him.

The damage for the mere use of the water for power, as assessed in this way by both the expert and the commercial witnesses for the petitioners, amounted in the aggregate to a sum variously estimated at from $1,300,000 to $1,800,000. These sums were many times larger than the amount of money admitted to be just compensation by the witnesses for the defendant. In reply to the theory of the defendants, they argued that in point of fact the petitioners had not been deprived of any "horse powers," and that really there is no such commodity known as a horse-power. The thing which the owners had lost by the diversion of water from their premises was not even the ownership of the water itself, but simply an easement to their estates, namely, the right to have the water come down through their premises from above in order that they might make any reasonable use of it, in transitu, which should not appreciably diminish its flow through these premises to others below them. It was used largely by each manufacturer for generating power at a turbine. Counsel for the city argued that the way to estimate the value of this use of the water to each petitioner was, first, to ascertain the exact extent to which the water was available for power throughout the year at each privilege, and then to estimate the cost of substituting other practicable and economical means of generating power to the same extent and at each privilege. This computation should give at least the highest possible annual value to the use of

the water, but in certain cases it might exceed the actual loss sustained by the petitioner. Such a case would arise, for instance, where the waterfall was situated in a locality so remote from transportation facilities as to make it difficult to find a purchaser of the privilege at any price, even if already developed.

The witnesses for the defence also claimed that as none of the "horse powers" of which its owner was deprived by the act of the city could have been sold anywhere except at the particular place where the falling water could be used as it fell (the only right, they maintained, which the city interfered with) to generate power, because the spot was the only one where the water could be used, whether for power or for other reasonable use; therefore, there can be no such thing as the market value of a horse power resulting from this use, equally applicable to each unit of power wherever generated on this river. A horse power, being a unit of activity, not taxed, intangible, could not be a piece of property, but it was a property of a piece of machinery, and hence the theory of the petitioners must be a piece of folly.

Whether or not the theory of the defence is a refutation of the other theory, it is true that the cross-examining attorney for the petitioners caused more of the witnesses for the city to flounder in a quagmire of confusion from which they seemed unable to extricate themselves. It is likely that this was no fault of these witnesses, but rather it was due to the, at present, confused state of the art of estimating such damages. The court has established in Massachusetts that the true value of a property is its fair market value, as between a willing buyer and a willing seller. This proposition was continually harped upon by counsel and witnesses on both sides. The petitioners claimed they were establishing, out of the mouths of their engineering witnesses, the fair market value of power, that is, of a horse power. William Kent stated this fairly enough. He said he had examined the steam and water power plants at 25 of the mills. In the course of his evidence he specifically stated that a horse power is property which may be sold, and which has an established market value, which value must be somewhere near its cost of production by steam, in a given locality like that of those 80 privileges. He does not relate the financial injury caused by the diversion of water to the mill properties at all—that is, he does not allude to what they may have been worth before and what after the diversion. He does not say anything about easements. A man who loses 1-horse power from a 20-horse power fall is damaged to just the same extent as he who loses 1-horse power from a 1000-horse power fall, even if —as was true in the Blackstone River mills—the one needs a 20-horse engine, with slide valve and throttling governor, to balance the inequalities of his 20-horse water power, while the other uses a 1000-horse power engine to balance the inequalities of his water power. That is to say, even if one man will lose $100 per annum—the cost of maintaining 1-horse power with his engine—by the diversion, while the other will lose $15 per annum, the one is to receive as fair compensation but $50, while the other makes a net gain, in this operation of the Kent theory, of $35 per annum, and is in the market to "lose" more "horse-powers" at the same gainful rate. Moreover, the variations in the cost of coal, up and down the stream is also immaterial, although it was as high as $4.60 at the source and as low as $3.00 at Pawtucket. According to this theory—let the $3.00 purchaser chuckle and the $4.60 man murmur—the market price of a horse power "goes." These were the reflections of counsel for the defence. His own witnesses testified, one after the other, that the damage or financial injury done the petitioners was certainly not greater than a sum of money the interest of which would enable them

to produce the lost power by other means; that the fact was that every one of the mill owners owned and operated a steam plant large enough, or nearly large enough, to carry the entire mill load; and that what these mill owners would do in the future, as, in fact, they had done since the diversion, would be to carry the load, formerly driven most of the time by the lost water, continuously on their steam engines, and that hence a coal pile large enough to do this, if freely supplied to them, would place them in as favorable a position to carry on the business of manufacturing goods as they ever enjoyed. Some said they should also be allowed supplies, as waste, and oil, and labor. Still others thought they should further be allowed a part of the interest, depreciation, taxes, and repairs on the steam plant, such a part of the whole amount of these items as the lost power bore to the entire power of the engine. One witness for the city thought that enough wasn't made of the benefit it would be to these engines, large and small, in the direction of smooth working, to carry continuously an additional load, thus allowing their valve gears to work more normally than before the diversion. He also called attention to the generally accepted belief that the friction of an engine was independent of the external load, so that, as it is friction that wears out an engine, no extra use of the mechanism was imposed on the mill owner as a result of driving the greater load. This witness favored compensation on a coal-cost basis, in view of the fact that as (according to the testimony of the hydraulic engineer retained by the city) the flow of water was liable to almost entirely cease at certain times in extra dry years, therefore not one of these privileges was of any considerable value unless operated in conjunction with a steam plant, of a size at least three quarters of the greatest available power of the privilege. This was corroborated by the observed fact that in nearly every mill a steam-power plant as large as or larger than this size was at work all the year round. He testified, in effect, that the water privileges in New England which maintained a flow of water sufficient to drive a mill constantly all the year round could be counted on the fingers of a man's hand, and that none such could be found on either Kettle Brook or the Blackstone.

It was right at this point in the testimony of witnesses for the city that the edge of the quagmire of confusion, alluded to above, was encountered by them. Mr. Goulding, attorney for the petitioners, sought to have the city's witnesses admit the truth of Mr. Kent's theory, and say frankly that a "water-power" was itself property; then that any subdivision of it, as 1-horse power, was also property. If he could do that then his side would win; for the "fair market" value shibboleth would become operative. Not the cost of making the power, but the selling power of it, would be the test of the damage his clients had sustained. He introduced much testimony to show at what price, per horse power, mechanically or electrically transmitted power was actually sold in the Blackstone valley. Messrs. Kent, Whitham, and others—witnesses for the petitioners—freely admitted that the cost of producing a horse power by steam was very different in the different mills; in fact, there could be no comparison between the cost at the least economical plant and that at the most economical plant. It is probable that no attempt would have been made by them to combine these costs in a class and average them to find an average cost which it would do to call the market value, had there not been so many other mills of all sizes to be considered by the tribunal at the same time.

Electricity in Textile Mills.

The presence of frictional electricity, generated by the motion of belts, pulleys, running stock and machinery, is a source not only of annoyance but

of positive loss to textile mill owners. In carding and spinning particularly, electricity has the effect of causing a change of several numbers in the yarn, and causing it to snap and break; while the quality and width of the woven goods is noticeably affected. Futile attempts have been made to conduct away this troublesome electricity, but all parts of the machine cannot be properly connected for the purpose, and a resulting residue of electricity is sure to make itself known. It is well understood that on moist days, by atmospheric condition, the electricity escapes as fast as produced; while on dry days it is insulated in belt, machine and stock, and cannot escape into the air, for dry air is a poor, while moist air is a good, conductor of electricity. Moisture evidently plays a very important part in electrical troubles, and various attempts have been made to imitate the action of the moist atmosphere by admitting water to the mill rooms on dry days. The effect which moisture in the air has upon electrification in the rooms appears to be dependent upon, and increases with its temperature. With the relative humidity above a certain per cent., no trouble is experienced; as this per cent. decreases, the electricity makes its appearance, and grows to be more and more annoying.

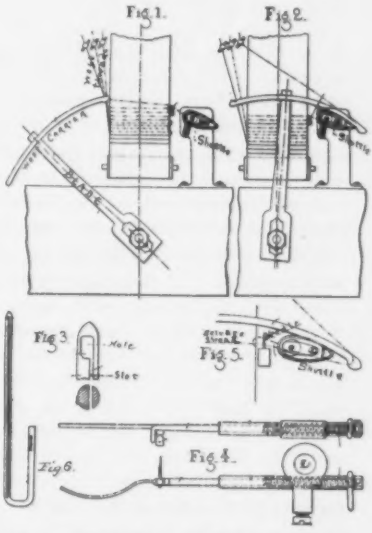
A careful consideration of these statements will satisfactorily prove that the whole question of escaping from electrical trouble will be found in the matter of relative humidity. If there is sufficient moisture in the atmosphere, there is no trouble; if there is not sufficient moisture, electricity always appears.

As moisture depends upon the currents of air to distribute it, no better means can be found than the blower system for obtaining the required results. While doing efficiently its duty as a heating and ventilating medium, the air may be moistened to any desired degree by sprays or evaporating pans in the passages from the heaters to the rooms. The exact humidity of the air may be noted by a hygrometer, and regulated to the closest degree. With an average temperature of 70 to 80 degrees in the room, the per cent. of humidity need not exceed 70. This will insure a comfortable atmosphere, and will absolutely prevent the presence of any electricity. The mere benefit from this particular source will repay any enterprising owner for introduction, in these days when a saving of a fraction of a cent per yard is of vital importance. But with the additional advantage of an efficient heating and ventilating apparatus, controllable under all conditions, there can be no hesitation as to the desirability of the system.—Extract from Treatise on Ventilation and Heating, B. F. Sturtevant Co., Boston, Mass.

A Needle Loom.

We illustrate a piece of mechanism invented by a Frenchman, as part of a shuttleless power loom.

Figure 1 represents diagrammatical-



ly the weft-carrier at the commencement of its stroke. Fig. 2 similarly represents the weft-carrier at the end of its outward stroke. Fig. 3 shows, on an enlarged scale, the end view and

a cross-section of the weft-carrier. Fig. 4 represents in plan and elevation, respectively, the needle by which the weft-loop is engaged and held as well as its holder. Fig. 5 illustrates in plan the fixed shuttle and the method of engagement of the shuttle-thread with the weft-loop. Fig. 6 represents a top plan of the weft-carrier.

The object of the device is to enable cloths to be woven in several colors and with figured patterns by means of a single weft-carrier or conveyer.

According to these improvements the weft-carrier has engaged with it a plurality of weft-threads. Upon the opening of a shed in the warp the weft-carrier takes through the shed a selected thread to the opposite side, where the loop of the weft-thread is engaged by a selvage-thread from a fixed shuttle and held by a rising-and-falling needle until the weft-carrier has returned through the same shed to its starting-point. The weft is then beaten up, the shed re-crossed, and the cycle is repeated. There are two shoots of weft in each shed.

The curved weft-carrier is fixed upon an oscillating blade, through which an oscillatory motion can be given to it. Through the free end there is pierced a hole, seen in Figs. 3 and 6, with which there communicates a slot, extending the whole length of the carrier. This slot opens into the hole in such a manner as to leave a shoulder and so that one side of the hole farther from the shoulder is even with one side of the slot. In the figures three weft-threads are indicated; but as many or as few as may be desired may be employed. All the weft-threads to be used are threaded through the hole Fig. 3, and separately through suitable mails or healds, by means of which they may be lowered and lifted separately, as controlled by pattern mechanism or jacquard cards. If one of the threads be thus lifted, that thread will be carried by the shoulder of the opening across the fabric, as indicated by Fig. 2, while the remaining weft-threads are passed by the slot, and thus are unmoved. At the end of the race there is fixed a small auxiliary shuttle carrying a selvage-thread. The loop made by the returning weft interweaves with this thread, as indicated by Fig. 5.

To obtain a very even selvage and to insure that the loop of the weft is not pulled within the fabric by the returning weft-carrier, a needle may be employed.

As soon as the weft-carrier has arrived at the position indicated by Fig. 2 a device lifts the needle, so that it enters the weft-loop and remains there until the carrier has returned to the position shown by Fig. 1. The needle is then lowered at the moment when the weft is beaten up. It is then forced back by the slay, and immediately after the lathe has retired it returns to its first position, whence it re-commences its movement on the completion of the next outward stroke of the weft-carrier.

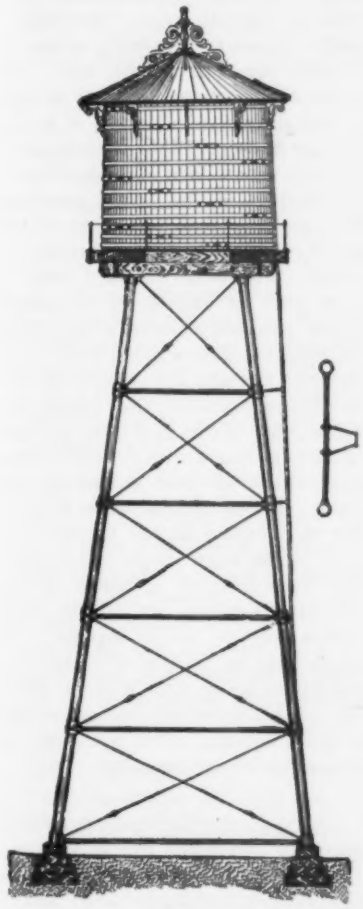
Combined Wood and Iron Towers.

W. E. CALDWELL CO.

The advance in the price of all iron and steel during the past year has materially affected the cost of iron towers and to meet a demand for lower priced structure, which at the same time shall be durable, the W. E. Caldwell Co., Louisville, Ky., have designed a tower which, while less expensive than their standard Patent Sectional Steel Tower, they claim to be practically as durable as an all iron tower, while it costs only about half as much and lasts twice as long as an all wooden one.

It is designed to do away with the objectional features of a wooden tower, there are no mortises or tenons to impair the strength of the structure, nor any brace seats or openings to collect water. Where water lodges, the timber will rot and give out, and the elimination of these objectional features is the strong point of this structure, for with no notches or holes the surfaces of the tower are smooth and unbroken, and can, therefore, be kept thoroughly painted.

This tower is built on the same general lines as their sectional steel pipe tower, the only wooden members being the columns and struts. The sway bracing is of iron and also connections to receive the struts which bind the sections together. They have also



retained the feature of building in short sections, which minimizes the cost of erection.

For the benefit of those concerns who prefer to build their own towers and are situated so that they can do so advantageously, they make an arrangement to supply plans and specifications, and have prepared a very comprehensive table of weights, capacity, costs, etc., which enables anyone who is interested in the subject to determine for himself which is the most economical method and just what such a structure will cost.

—There is apparently some dissatisfaction among those constituting the American Felt Company, which was organized but a short time ago, composed of all the principal felt manufacturing concerns in this country. At the annual meeting of this company, last January, three of its prominent officials severed their connection with it, and competing companies are said to be in contemplation by those who have resigned. W. J. Tingue, president of the American Felt Company, has been replaced by Joseph G. Ray, and William House, secretary, by William S. Armstrong. W. S. Taylor is no longer in charge of the wholesale department. Mr. Tingue, it is reported, has virtually retired from active business, though he was re-elected a director of the American Felt Co. and retains his connection with the Tingue Mfg. Co., of Seymour, Conn. This mill formerly made plushes, but its product now is principally confined to yarns. Mr. House is now engaged in the felt business with the firm of E. Tingue, House & Co., at 59 and 61 Reade Street.

—We have just received from the officials of the Paris Exposition of 1900, an announcement of an international congress of technical education, which will be held from the 6th to the 11th of August. Similar gatherings, which have produced appreciable results, have taken place at Bordeaux, Paris, London, Antwerp and Venice.

—In 1845 Leuchs brought out his zinc vat, although it was long before the conservatism of the dyers would permit them to look upon it as it deserved.

—A dyer does not really need a great number of dyes if he knows how to mix them and the influence one color has on another.

Wool Products of Uruguay.

The wool clip of Uruguay in late years has been found a most profitable investment on the part of the "estancieros," and just now a phenomenally high price rules, with an average clip to reap its great benefit. The scarcity of wool in the world's markets gave the prices a rapid advance in August, and many sold at 21½ cents per pound. For some years the wool clip of Uruguay has been sold in lots of 22 pounds, or 10 kilograms, and not by the single kilogram, save only when a fraction appeared in the scale on sale. The price has constantly advanced, and sales have been made at $6.33 in United States gold for 22 pounds, or about 30 cents the pound. No such price has ever before been paid in Uruguay, or much above one-half of it. The average of the sales, however, is $5.40 per 10 kilograms, and the clip will reach market at about that figure, as buyers have covered the sheep-raising departments to contract for every bale. When it is considered that the highest previous average rate per 10 kilograms was $2.63, the importance of the increase may be appreciated.

The following official trade returns of wool production for the years named are given. The production includes all the wool—criolla and belly wool.

Year.	Production.
1894-95	39,157,334 kilograms.
1895-96	50,765,037 "
1896-97	42,850,227 "
1897-98	51,678,340 "
1898-99	46,400,000 "
1899-1900	44,000,000 "

Nearly the entire clip, writes Albert W. Swalm, United States consul at Montevideo, to the State Department, Washington, has been bought or contracted for on European account, and is being rushed forward very rapidly.

Anthrax from Wool Sorting.

The Bradford Chamber of Commerce, in conference with the Trades and Labor Council of the Bradford District, England, have drafted certain rules for the sorting and handling of wool, so as to prevent the disease of anthrax spreading and injuriously affecting the health of those handling wools of foreign growth. These rules require that all alpaca, Persian, and other wools, including camel's hair, shall be opened over a fan with a sufficient downward draft, when not washed direct from the bale. The draft deemed sufficient shall be such as will draw five cubic feet of air per minute through each opening board for each square inch of the aperture at the bottom of the board, providing that not less than 500 cubic feet of air per minute is drawn through the board. All badly damaged wool or hair shall be opened by an experienced man and damped with a disinfectant, and then washed without being put through any willow or dust extracting machine. No person having an open cut or sore upon any part of their body shall be allowed to tend any willow or dust extracting machine. Proper prevention is required for the keeping of the clothing and food of the work people employed in the warehouse, or attending to any machine through which the wool passes before being washed. No meals shall be allowed to be taken in the willowing or carding room. There are a number of other requirements of like nature, which we will not enumerate at this moment.

—No man can find himself in a position so trying and exacting as that in which he is called upon to control and direct his fellows.

—Whatever tends to increase the general efficiency of the artisan, improves the quality of his workmanship and is, therefore, of the utmost value and importance to his employer.

—Technical education is a subject which, in recent years, has attracted very considerable attention on both sides of the Atlantic.

DYEING DEPARTMENT.

Dye Recipes for March.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16 page pamphlet, in convenient form for preservation. Subscription price for the TEXTILE WORLD with the Dyers' Supplement is $4.

Recipe No. 33.

Gray on Cotton Yarn.

Diphenyl Jet Black on 100 lbs. of cotton yarn.

Prepare the dye bath with

¼ lb. Diphenyl Jet Black.

(John J. Keller & Co., 104-106 Murray St., New York.)

20 lbs. Common Salt.

Enter yarn at about 180° F. bring to a boil and dye at this temperature for one hour.

One of the features of Diphenyl Jet Black is its fastness to light and also to washing.

Recipe No. 34.

Brown on Cotton Hosiery.

Direct Brown 11,992 on 100 pounds of cotton hosiery.

Prepare dye bath with

20 lbs. Common Salt.

4 lbs. Direct Brown 11,992.

(O. S. Janney & Co., 8-10 Letitia St., Philadelphia, Pa.)

Enter the dry hosiery at the boil, and continue the dyeing at this temperature for one and one-half hours, then wash and dry.

The above recipe would apply to dyeing in an open kettle, in which case the goods should be poled. Even better results are obtained however by the use of dyeing machines, in which case the dry hosiery is put into the cold dye bath and the machines started running, gradually raising to the boil, then boiling for one hour and finally washing and finishing.

Direct Brown 11,992 gives an extremely full and rich shade of brown, and possesses great coloring power. It is very soluble in water, and goes on the fibre evenly, producing a shade which is quite fast to light and fairly fast to washing, and is especially adapted for the dyeing of hosiery tans. (See recipe 19 in February issue.)

Recipe No. 35.

Black on Worsted Yarn.

Alizarine Black N B B on 100 pounds worsted yarn.

Prepare the dye bath with

10 lbs. Sodium Sulphate.

5 lbs. Acetic Acid.

Heat to 140 to 160° F., and add the dyestuff, which has been previously dissolved in boiling water.

6 lbs. Alizarine Black N B B.

(Wm. J. Matheson & Co., Ltd., 182 Front St., New York.)

Enter the previously scoured material, raise to the boil and dye at this temperature for about one hour, during which time the bath will become nearly exhausted.

Then add

2 lbs. Copper Sulphate,

and work for another 15 to 20 minutes.

Wash and dry.

Alizarine Black N B B is particularly useful in the dyeing of hosiery yarn, and is remarkably fast to washing and light, perspiration, rubbing and wearing.

Recipe No. 36.

Black on Cotton Yarn.

Vidal Black D Extra on 100 pounds cotton yarn.

Prepare dye bath as follows:

12 lbs. Vidal Black D Extra.

(From the Vidal Fixed Aniline Dyes, Ltd., London, Eng., Sykes & Street, 85 Water St., New York, sole American agents.)

5 lbs. Sodium Sulphide.

75 lbs. Common Salt.

3 lbs. Soda Crystals (According to hardness of water).

Dissolve the dyestuff and sodium sulphide in about 10 times their weight of boiling water, then enter the solution in the dye bath, and add the salt and soda, stirring the bath meanwhile. Raise temperature to 140° F. Enter the cotton, boil up and dye for one hour. Lift and wash well in two waters. Air for one hour, and then fix for 15 minutes in a bath of

5 lbs. Bichromate of Potash.

5 lbs. Sulphuric Acid,

at a temperature of 130 to 140° F. Lift; wash very thoroughly, and finish per usual methods.

This black must always be dyed in wooden or iron kettles, and never in those of copper, or come in contact with copper during the dyeing operation. Bichromate of Soda as a fixing agent, in combination with sulphuric acid gives bluer shades than those obtained with bichromate of potash and sulphuric acid. Bluestone can also be used in place of the bichromate, and where used the black will give a greener shade. The length of time in the fixing bath is given as 15 minutes, and if the goods are left in longer, it will have a tendency to redden the shade. The dye bath is not exhausted, and must be preserved. For successive baths, employ about ½ the proportions used. (See recipes 31 and 32 in February issue.)

Recipe No. 37.

Brilliant Green on Worsted Yarn.

Brilliant Milling Green B on 100 lbs. of worsted yarn.

Prepare dye bath with

1 lb. Brilliant Milling Green B.

(Wm. J. Matheson & Co., Ltd., 182 Front St., New York.)

10 lbs. Glauber's Salt.

5 lbs. Sodium Bisulphate.

Enter the goods at 140° F., bring to a boil within 20 minutes, and continue boiling for ¾ to 1 hour.

Brilliant Milling Green B, as name implies, is fast to milling. It has very high coloring power and goes on the fibre evenly.

Recipe No. 38.

Scarlet on Cotton Yarn.

Trona Red G G on 100 pounds cotton yarn.

Prepare dye bath with

6 lbs. Trona Red G G.

(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

Dissolved with 4½ lbs. solid caustic soda (dissolved in water, or 11 pints of soda lye 76° Tw.), and a sufficient quantity of boiling water with constant stirring. This hot solution is then added to the dye bath containing

150-200 gallons of water.

100-150 lbs. Common Salt.

Enter the yarn at the boil, shut off steam and work for ¾ of an hour just under the boiling point, then lift the goods, hydro extract well, but do not rinse, and then work for a short time in a cold solution of one per cent. sulphuric acid (1 lb. sulphuric acid per 10 gallons) and then rinse thoroughly in cold water. As the bath is not exhausted, it may be preserved for further use, when the quantity of color as soda lye should be diminished one-third. The quantity of salt added depends upon the amount of liquor removed from the bath with the cloth.

Trona Red G G is characterized by the fastness to dilute mineral acids and organic acids, and its great clearness of shade. The shade is turned slightly yellower with warm alkalies, but cold dilute acid restores it. Trona Red G G may also be dyed on wool, either with acetic acid or dilute cold mineral acids. (See recipe 25 in February issue.)

Recipe No. 39.

Green on Cotton Yarn.

Direct Green C on 100 lbs. of cotton yarn.

Prepare the dye bath with

3 lbs. Direct Green C.

(O. S. Janney & Co., 8-10 Letitia St., Philadelphia, Pa.)

20 lbs. Common Salt.

Enter yarn at 180° F., and while turning raise to the boil and dye at this temperature for one hour. Wash and dry.

Direct Green C gives a full and rich shade of green, and while the shade produced is on the dark side, it has lost none of its life, which is desirable in a green of this character.

This dyestuff produces shades which are especially fast to light and washing, and withstands the action of light and soap to a marked degree.

The bath is not exhausted and may be used for subsequent dyeings.

Recipe No. 40.

Red on Cotton Yarn.

Brilliant Direct Red No. 249 on 100 lbs. of cotton yarn.

Prepare dye bath with

25 lbs. Common Salt.

3 lbs. Brilliant Direct Red No. 249.

(Schoellkopf, Hartford & Hanna Co., Philadelphia, Pa.)

Enter yarn at 180° to 190° F., bring to a boil and dye for one hour at this temperature.

Brilliant Direct Red No. 249 will, if used in low percentages, produce brilliant shades of pink.

Recipe No. 41.

Blue on Cotton Cloth.

Direct Blue 5 B on 100 lbs. cotton cloth.

Prepare the dye bath with

2 lbs. Direct Blue 5 B.

(New York & Boston Dyewood Co., 55 Beekman St., New York.)

20 lbs. Common Salt.

Enter material at 180 to 190° F., bring to a boil and dye at this temperature for one hour.

Direct Blue 5 B is most desirable for the dyeing of all-cotton knit goods.

Recipe No. 42.

Olive on Cotton Yarn.

Direct Olive Y on 100 lbs. cotton yarn.

Prepare the dye bath with

20 lbs. Common Salt.

3 lbs. Direct Olive Y.

(The Stone & Ware Co., 157 Maiden Lane, New York.)

Introduce the yarn at 180 to 190° F., with constant turning to insure evenness, bring to a boil and dye at this temperature for at least one hour.

As with other direct cotton colors the bath should be kept of as small volume as possible.

The above amounts are for the first bath. If the same bath is used a second time the amount of dyestuff used may be made considerably less.

Direct Olive Y gives an exceptionally brilliant shade of olive, which stands washing very well.

Recipe No. 43.

Navy Blue on Worsted Yarn.

Victoria Navy Blue on 100 lbs. of worsted yarn.

Prepare the dye bath with

6 lbs. Victoria Navy Blue.

(Farbenfabriken of Elberfeld Co., 40 Stone St., New York.)

10 lbs. Glauber's Salt.

5 lbs. Sulphuric Acid.

Enter yarn at 180° F., bring slowly to a boil and dye at this temperature for one hour.

To insure evenness it may be well to add the sulphuric acid in several portions rather than all at once.

Victoria Navy Blue is equally well adapted for use on piece goods. It dyes level and produces very cheap blues of good fastness to rubbing.

Recipe No. 44.

Dark Green on Worsted Yarn.

Compound Shade on 100 lbs. worsted yarn.

Mordant the yarn in a bath made up as follows:

3 lbs. Potassium Bichromate.

1½ lbs. Potassium Bitartrate.

Enter at 160° F., bring to a boil and continue the boiling one hour. Wash and dye in a bath made up with

5 lbs. Alizarine Yellow G G.

4 lbs. Alizarine Blue G G.

(C. Bischoff & Co., 87 Park Place, New York.)

5 lbs. Acetic Acid.

After stirring the bath well, enter the yarn at about 120° F., bring slowly to a boil and dye at this temperature for one hour.

Alizarine Yellow G G and Alizarine Blue G G are particularly well adapted for the production of compound shades.

Recipe No. 45.

Brown on Cotton Yarn.

Direct Brown B R on 100 lbs. cotton yarn.

Prepare dye bath with

5 lbs. Direct Brown B R.

(New York & Boston Dyewood Co., 55 Beekman St., New York.)

20 lbs. Common Salt.

Enter yarn at 180° to 190°, bring to a boil and dye at this temperature for one hour.

Direct Brown B R is very desirable for the dyeing of all cotton knit goods.

Recipe No. 46.

Blue on Cotton Yarn.

Diphene Blue B on 100 lbs. of cotton yarn.

Mordant the yarn with

15 lbs. Extract of Sumac.

Enter cotton at 130° F., turn for twenty minutes at this temperature, then sink for twelve hours. Lift the yarn, wring, and, without washing, work for twenty minutes in a cold bath containing

2 lbs. Antimony Salts.

Wash thoroughly and dye in a bath made up with

3 lbs. Diphene Blue B.

(Berlin Aniline Works, 72 Front St., New York.)

5 oz. Oxalate Soda.

7 lbs. Acetic Acid.

Dissolve these in boiling water and add to dye kettle. Begin the dyeing at 140° F., bring to a boil and dye one hour at this temperature.

Diphene Blue B is very fast to washing, and since it is fast to steaming, it is found valuable in calico printing. (See Recipe 48, this issue.)

Recipe No. 47.

Yellow on Worsted Yarn.

Chromazo Yellow G No. 280 on 100 lbs. of worsted yarn.

Mordant the wool in a bath containing

2 lbs. Bichromate of Potash.

2 lbs. Lactic Acid.

Entering the goods at about 180° F., and boiling at this temperature for one hour.

Then dye in a fresh bath containing

2 lbs. Acetic Acid.

2 lbs. Chromazo Yellow G. No. 280.

(Schoellkopf, Hartford & Hanna Co., Philadelphia, Pa.)

Enter the goods at 160°, raise slowly to the boil and dye at this temperature until the bath is exhausted.

Chromazo Yellow G No. 280 produces shades wnich are fast to light and milling.

Recipe No. 48.

Blue on Cotton Yarn.

Diphene Blue R on 100 pounds cotton yarn.

Mordant the yarn with

15 lbs. Extract of Sumac.

Enter cotton at 130° F., turn for 20 minutes at this temperature, then sink for twelve hours. Lift the yarn, wring out, and, without washing, work for 20 minutes in a cold bath containing

2 lbs. Antimony Salts,

wash thoroughly and dye in a bath made up with

3 lbs. Diphene Blue R.

(Berlin Aniline Works, 72 Front St., New York.)

5 oz. Oxalate of Soda.

7 lbs. Acetic Acid.

Dissolve these in boiling water and add to dye kettle. Begin the dyeing at 140° F., bring to a boil and dye one hour at this temperature.

Diphene Blue R is very fast to washing, and since it is fast to steaming, it is found valuable in calico printing. (See Recipe 46, this issue.)

—According to the German papers there is a difficulty in fixing the customs duty on mercerized and nitrated cotton exported to Germany, principally from Manchester. This method of preparing cotton being a new invention, no provision has been made for it in the official customs tariff.

Matching Colors.

TRANSMITTED AND REFLECTED LIGHT.

The method of matching colors by transmitted light, or what is generally termed overhand matching, is often found useful for giving the colorist an idea of how the shade has been composed. The experienced eye of the professional dyer and color mixer can often tell whether shades of olive, russet, sage, browns and drabs have been dyed with natural color stuffs or with aniline colors by examining them overhand. The natural coloring matters, such as fustic, quercitron bark, archil, and others, all appear somewhat redder and duller on viewing overhand, while the aniline colors, as a rule, have a brighter and clearer appearance when the light is examined through the surface fibres. It is always found that in viewing colors in artificial light a better idea of their true daylight appearance can be gained by holding the shades close up to the light and viewing them overhand. In examining colors by transmitted light the eye receives the colored rays which come through the dyed fibres on the surface of the yarn or the fabric, and the color therefore appears of a clearer and purer shade than when seen by reflected light.

Colorists and dyers may also have noticed another phenomenon in matching certain dyestuffs, such as methyl violet. Some of the lighter tints appear much bluer by overhand examination than by looking down on the color. This is owing to the phenomenon known as dichroism, which, like fluorescence, tends to modify the aspect of the color in artificial illumination. In the case of the methyl violet just mentioned the light, which is reflected from the surface of the dyed material, has entered a considerable depth into the interstices of the fibres and, in doing so, certain of the blue rays have become absorbed and the red rays predominate. Hence such a dichroic violet looks redder by reflected light than by transmitted light. This effect becomes more noticeable if the fabric be of a velvet or plush pile. In the same way a yellow shade of buff, dyed with fustic and cochineal pink, looks redder by reflected light, or on a cut surface pile, than by transmitted light. This is owing to the same cause, namely, selective absorption or dichroism.

It will be found, as we proceed, that a knowledge of the optical properties of the coloring matters themselves is necessary to make, in all respects, a perfect color match in dyeing. The phenomenon of dichroism is one of great interest to the textile colorist, as it alters, in a very considerable degree, the appearance of many of his colors. The dichroism of dyed colors is exactly similar to that seen in certain color solutions. If, for example, we examine a very dilute solution of Magenta, we notice that it is of a blue pink hue; but if the color be strengthened or the layer of the solution be deepened, it changes from a blue pink to a cherry red. In the same way a thin layer of a solution of Eosine is a beautiful blue pink, while a deeper layer presents a scarlet color. A thin solution of sulphate of copper is a green blue, while a stronger solution, or a deeper layer of the weak solution, presents a pure blue color. Many such example might be given, all showing the phenomenon of dichroism. The cause of such changes is owing to the colors being more transparent to certain colored rays than others. Such cases of selective absorption are common to all colorists, and the same effects are observed when the colors, instead of being in solutions, are dyed on fibres of a good lustre, and woven into velvet and plain surfaced goods. Every dyer must have noticed the slight changes in hue when certain coloring matters are reduced for making a scale of graduating tints. This is a question of much importance to dyers, and we intend to consider it more fully when dealing with the matching of colors dyed on fabrics having a velvet or cut pile.

The month of May is considered by authorities to be the best for color

matching, as the light is—or ought to be—exceptionally pure and clear, and is also less liable to vary in quality than at other times of the year. In our large cities and manufacturing towns where the various industries are carried on, the atmosphere unfortunately becomes very dense and foggy. In such an atmosphere it is well nigh impossible for the dyer of silk and woolen fabrics to match his colors accurately. The great predominance of the red rays makes the appearances of the colors somewhat similar to that seen by viewing them under an artificial light. This may be expected from the fiery red appearance of the sun during a murky fog. When the daylight is of such a poor quality the dyer has either to lay aside his matching until the next day, or to match his shades with the aid of a good artificial light.

Several artificial lights have been recommended as a substitute for daylight in color examination, but only two are of real service to the colorist in this respect. These are the magnesium light and the electric arc light. The magnesium light, produced by burning a strip of magnesium wire or ribbon, is of great service to the colorist who has not the advantage of the electric arc light. Under such unfavorable atmospheric conditions the colorist, by examining his shades in the light of burning magnesium, may get their true daylight aspect. For the purpose of color examination are sold various different types of magnesium lamps, but, to the colorist who is skilled in noting at a glance any little differences in shade, it is often found that about a foot of magnesium ribbon held while burning by a small pair of pliers does the purpose equally well. The aspect of colors under the electric arc light is, in nearly every case, identical to good daylight. There are, however, a few special cases where the dyed colors are extremely sensitive to any variation in the purity of light; and in these a slight difference is noticed between their daylight and electric arc light aspect.

In making a careful examination of dyed fabrics, the colorist often experiences much difficulty in matching perfectly a certain color dyed on velvet, or any rich material having a cut pile. Here the phenomenon of internal reflection shows itself and also, as already mentioned, the dichroic properties of the colors become apparent. Colors dyed on velvet surfaced materials are much deepened and enriched, owing to the repeated reflections within the interstices of the fibres. The effect produced is the same as if the dyed colors were illuminated with a light of their own color. This deepening of the color by repeated reflections tends, more or less, to modify the hue of the color. In making a perfect match on such fabrics, it is necessary to cut the trial swatches so as to form a pile. Textile colorists often experience the difficulty of matching colors with a velvet pile versus a tapestry pile, or a flat surface like dyed cloth or printed calicoes. Fibres of a high lustre, such as the finer qualities of wool, silk, China grass or the Rhea fibre, are difficult to match, as their high lustre accentuates the optical properties of the coloring matters themselves. For example, Rhodamine dyed on silk has a more orange appearance than when dyed on cotton, owing to the orange hue of its fluorescence being mingled with its proper color. Many examples may be given. The subject of matching accurately dyed fibres of different lustre and colored fabrics of different texture is really the most difficult part of the colorist's work. To make a perfect color match, the dyer must try, as far as possible, to use the same color stuffs as employed in the original color. It is often difficult to get a perfect match to the natural dyestuffs with the aniline colors. Some dyers may not give this much attention, but, at the present day, when competition in all departments is so keen, we must do everything in our power to make a perfect copy. A carpet, or in fact, any dyed or printed material, which has been colored solely with the natural

dyestuffs may be very closely matched in daylight with colors of coal tar origin; but if these two pieces of colored fabric be examined in an artificial light, such as oil lamp, gas or incandescent electric light, there is found to be a wide difference in the appearance of the two patterns.—David Paterson in The Dyer and Calico Printer.

Dyeing Mercerized Union Goods.

William J. Matheson & Co., New York, have issued a pattern card, showing union fabrics in imitation of wool, in crepon styles, which at present are so much in favor, the effect being obtained by mercerizing with caustic soda lye.

The mercerizing is executed in a lye of 15—30 degrees, cooled down to 5—10° C. (40—50° F.) by means of a suitable cooling apparatus. The previously finished, somewhat moist goods are passed through this lye in a vat provided with rollers and a squeezing apparatus.

Depending on the concentration of the lye and the size of the vat the passage should last from 1 to 3 minutes; weak lye necessitating a longer, stronger lye a shorter duration of the process.

Without being rinsed the goods are then immediately passed into a cold bath, strongly acidulated with muriatic or sulphuric acid, worked therein well and are then rinsed repeatedly and if necessary neutralized with ammonia.

Even after the passage of the goods the acid bath must still be strongly acid.

Generally the goods are mercerized before being dyed, but if desirable for manufacturing reasons also the dyed goods may be mercerized which is especially resorted to for blacks and such staple shades produced in large quantities.

Goods previously mercerized are dyed in a neutral bath as per the known method in use for union goods, the quantity of glauber's salt may, however, be reduced by one half, 1 lb. per 10 gallons liquor being sufficient.

As the cotton possesses a greater affinity for the dyestuffs than the wool boiling is to be continued somewhat longer.

For two colored effects the wool is first dyed with the addition of 10% bisulphate of soda and hereafter the cotton is covered in a fresh bath of 30° C. (85° F.)—which should be kept as concentrated as feasible—charged with 2 lbs. glauber's salt and ¾ oz. soda per 10 gallons liquor.

For styles with a black cotton ground, however, the cotton is dyed first with the addition of 2 lbs. glauber's salt and 1½ oz. soda per 10 gallons liquor in a bath of 40° C. (105° F.) then the goods are rinsed, diazotized as usual and developed; hereafter the wool is dyed in an acid bath.

Goods which are to be first dyed and then mercerized are dyed as usual with 2 lbs. glauber's salt per 10 gallons liquor, rinsed, thoroughly hydroextracted and then mercerized.

Mercerizing Suit.

Thomas & Prevost, Crefeld, Germany, have instituted a suit in the United States courts against the United States Finishing Co., which will be watched by the dyers and finishers of cotton goods with profound interest, as the decision will have an important bearing on their trade.

A representative of Thomas & Prevost is reported as saying that there is no intention of demanding a monopoly of these patents and that Thomas & Prevost are perfectly willing at any time to license any responsible party to use them, but as the patents are valuable, for which was paid a large amount of money it is felt as though a royalty should be received from those who use the process. It is well known that Germany is opposed to granting a patent to any individual, believing that any invention should be shared by all the people alike.

This case is the result of a decision rendered by the German Court declar-

ing the patents of the above parties null and void.

These patents were acquired by the American Mercerizing Co., which is composed of the American Thread Co., Frank A. Sayles of Pawtucket, the Aberfoyle Mfg. Co., of Chester, Pa., and others. There are two processes which these patents cover, that of mercerizing yarns and the mercerization of piece goods. The latter is said to be divided between F. A. Sayles and Lesher, Whitman & Co., the last mentioned company having acquired control of a German's interest in this patent, under which the gloria cloths sold by this house are finished. At the time the purchase of the Thomas & Prevost patents was made by the American Mercerizing Co. it was stipulated that the former parties to the contract should see to it that the patent was not violated in this country. It is because of the universal adoption by finishing companies of this process that the present action has been brought by Thomas & Prevost and that the United States Finishing Co. has been singled out for defendant in a test case.

Bradford Textile Products at the Paris Exposition.

The manufacturers of textile fabrics about Bradford, England, are to make a collective exhibit at the Paris Exposition of this year, under the auspices of the Bradford Chamber of Commerce. A subscription of about $15,000 has been made, in order to cover expenses. A space 32 by 19 feet has been allotted to this exhibit, at the head of the grand staircase, surrounded on all sides by important thoroughfares. The exhibit will comprise textiles which are either manufactured, dyed or finished in Bradford and district. The patterns, or goods, received, are known only by distinguishing numbers, the names of the senders being known only to the secretary of the Chamber of Commerce. Yarns will be classified as far as possible according to the use to which they are put, viz., for linings, plushes, astrachans, mantle cloths, dress goods, worsted coatings, hosiery and embroidery, braid, fancies, mercerized, etc.

—A patent for an apparatus for mercerizing yarn in skeins has recently been taken out in Washington, the object of which is to provide a machine in which the operations of stretching, dyeing and washing the skeins, besides their accessory operations, will be performed so as to co-act to produce the best results in the finished article. The inventor appears to be a German, but we see nothing in the mechanical device to entitle it to special notice or illustration.

—A new washer for balbriggan and Jersey ribbed underwear will soon be brought out by the Troy Laundry & Machinery Co. They have been experimenting with a type of machine especially designed for this purpose, and now have perfected a machine, which is working very satisfactorily, and from which patterns will be made and a regular line put on the market before long. Mr. Wilcox of the Troy, N. Y., office will give further information to interested parties.

—Cleanliness is an essential adjunct to good work, and it is often recognized in practice that where the attendant is a person of neat appearance better work is invariably found on her machine as compared to another of more untidy habits.

—There is no question that weft yarn requires more careful attention than warp. It is more easily affected by atmospheric changes and by variations in the length of the staple.

—The traveller should be as light as possible without making too soft a bobbin, and still heavy enough to keep the thread from ballooning so much as to require a separator.

QUESTIONS AND ANSWERS

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring, not for publication, but as an evidence of good faith.

Two Stockings at Once.

Editor Textile World:

Will you please inform me if there is a machine made that knits two complete stockings, heel and toe, one inside the other and of the same size and weight?

T. O. G.

We do not know of any such machine, and if any of our readers have ever heard of such a one, should be glad to learn of it.

Pressing Hosiery Without Steam.

Editor Textile World:

Is there any way to press cotton hosiery besides the steam press process? If not, how would a man press his goods if his mill was run by an electric motor?

Mich.

There are very few mills today which do not use a steam press, and we do not think any other method would be productive of so good results. There is a press, however, for cold finishing, where the finish is obtained by pressure instead of heat and cold. We have sent you the address by mail. The cost is little compared with the hollow plate process, but the finish is not as good as they give, although they are used by some with fair results. Many years ago, plates were heated in an oven and these plates were then placed on the goods in the press and pressure applied, and were left to cool under pressure at least 24 hours. One difficulty was that the plates were unevenly heated, and, therefore, produced uneven results. This in an out-of-date method, however, and can hardly be recommended.

Peruvian Cotton.

Editor Textile World:

We are anxious to have the name of the party in New York who is a large importer of Peruvian cotton. This party is known as "The Peruvian Cotton King." Will you send us his address, if you have it? What grade is used mostly in this country?

E. R. W.

The largest handlers of Peruvian cotton in the United States are W. R. Grace & Company, 1 Hanover Square, New York. The grade used in this country is known as rough Peruvian.

Book on Dyeing.

Editor Textile World:

Can you name to me the best book on cotton dyeing?

J. W. R.

There is no book devoted exclusively to this subject, and would suggest writing to some of the leading dyestuff houses that advertise with us, for their color cards, which will furnish a mass of information of practical value to a dyer. A dyer, however, should be familiar with the theories of dyeing, and, therefore, we would recommend "The Manual of Dyeing," by Knecht, Rawson & Loewenthal, price $15. There are several good books on dyeing that are up to date, but others than the one just named treat more specifically of bleaching and printing.

Editor Textile World:

I should be very much obliged to you if you would kindly give me the following information:

1. List of all cotton mills and weaving mills in the United States, North and South, with their spindle capacity and consumption of cotton.
2. Condition of wages in the different mill districts, North and South.
3. How many mills operated by water power. In what section is water power mostly used?
4. List of mills which are dyeing and printing, and what class of goods they are turning out.
5. The principal distributing markets for dry goods, agents, commission.

Von.

The Textile World's Official Directory of the Mill Trade will answer your questions Nos. 1, 3, 4 and 5, and the January and June, 1898, issues of the Textile World contained an article on the question of wages, which will probably come as near answering your question No. 2 as anything.

Effect on Cotton.

Editor Textile World:

Please give me your opinion as to what would result to cotton packed in bales direct from the gin, to a density of 30 to 35 pounds to the cubic foot. Would the essential oil in the cotton cause it to ferment or rot?

P. W. H.

A density of 30 to 35 pounds, or even 40 to 50 pounds to the cubic foot, does no

injury to the fibre. It makes no difference whether the cotton comes direct from the gin, or otherwise. The essential oil, or that which naturally belongs to the cotton fibre, is not a cause for fermentation or rot. If anything, the oil has properties of preservation. Moisture from water, alone can create fermentation or rot. Because of the danger from mould, it is important that the cotton should not be baled in a damp condition, or that in which it is immediately after picking. A reasonable time for desiccation should be allowed the cotton between the picking and baling. Goods made from cotton with its natural oil, as is well known, will last for centuries without deterioration, unless subject to moisture.

Indigo Flocks.

Editor Textile World:

Kindly inform me, if possible to do so, what concerns use a dark, fine, indigo blue, sheer flocks, all wool?

S. S.

We have sent you the names of a number of mills who probably use this class of flocks.

Metric System of Numbering Yarns.

Editor Textile World:

What is the standard of the French, or metric, system of numbering yarn? I see some tables give it as the number of metres in one kilogram, and others give it as the number of metres in one-half a kilogram. Which is correct?

J. R. L.

In the metric system of enumeration, the counts of yarn denote the number of metres that go to a gram, or kilometres to a kilogram, the length of the thread being fixed as one 1000 metres, with decimal subdivisions. In numbering cotton, however, the one-half kilogram is used. That is to say, the counts of cotton yarn indicate the number of times one 1,000 metres are required to make up a standard weight of 500 grams (½ kilogram). For example, No. 20 cotton yarn is one, 20,000 metres of which weigh 500 grams (½ kilogram). The following table will give the weight in grams of 1,000 metres (kilogram) of cotton and worsted yarn, for different counts.

No.	Cotton.	Worsted.
1	500	1000
5	100	200
10	50	100
20	25	50
40	12.5	25
60	8⅓	16⅔
80	6.25	12.5

Can Velveteen Be Dyed Fast.

Editor Textile World:

Can you inform us whether velveteen such as is used for collars on overcoats can be dyed an absolutely fast color so as not to crock or soil the linen?

N. Snell.

The term "fast" can be applied to colors in a comparative sense only, as no absolutely fast colors are known, all of them yielding more or less to the action of light, scouring or friction. Crocking, which bothers our correspondent, is a very marked defect in indigo blue which is the best color we have to resist the action of light. When a color stands the action of light or friction in actual wear so as to give no trouble it is a fast color and this is the most that can be hoped for in velveteen. The defect is so objectionable and the remedy so desirable we have obtained the opinions of a number of chemists, dye manufacturers and dyers. These letters, which are too extended to print here, agree in the general statement that while the dyeing of non-crocking velveteen is necessarily a difficult operation, it can be done by using the best and proper dyes and care in their application to the goods. Much depends on the shade itself, some dyes being far more liable to smut than others. As crocking is due to the presence of coloring matters mechanically attached to, but not chemically combined with the fabric and which separates from the goods by friction, it is evident that attention to the operations of washing and cleansing after coloring is important and will go far towards making the color so fast to rubbing that no trouble will be given to wearer of the goods.

Horse Power Necessary.

Editor Textile World:

Will you inform me as to the amount of horse power necessary to run the weaving and finishing departments of a 50-loom mill on fancy worsteds.

A. N. D.

This question is too indefinite for us to give a satisfactory answer. In a very rough way, we might say that it would require 50 H. P.; still, there are many factors to be considered, which would have to be taken into account before any opinion can be safely stated. The width of the looms is not stated, but we assume that the machines are made by Crompton & Knowles, and are for broad goods. Very much depends upon the arrangement of the machinery and the conditions under which it is operated, and

whether the goods are heavy or light; whether many or few harnesses are used; and whether drop boxes are employed.

Bleaching Knit Webbing.

Editor Textile World:

Can you give me any information for bleaching knit webbing?

W. N.

Write to our advertisers who have bleaching agents for sale, also to manufacturers of bleaching apparatus.

Electric Singeing Machine for Knit Goods.

Editor Textile World:

Can you inform us if there is an electric singeing machine on the market for singeing knit goods?

N. K. C.

We do not know of any electric singeing machine for this purpose, but should any of our readers know of one, we should be pleased to be so informed. There are singeing machines for hosiery, but we know of none that are electric.

Belting for a Cone Belt.

Editor Textile World:

Can you inform me what is the best kind of belting for a cone belt on a roving frame? I have tried several kinds, but have failed to find one that has given perfect satisfaction.

J. C.

The usual belt that is used for this purpose is an ordinary oak-tanned, single ply, leather belt, about 1¾ inches wide. This belt should be very pliable, so that it will cling to the surface of the cones, especially on the small diameters, and should be as even in thickness as possible. Otherwise, the cone belt does not differ from ordinary belting. There are several varieties of patent cone belts.

New Publications.

Diamine Brown S. This is the title of a color card with samples and recipes, issued by Wm. Matheson & Company, New York, which can be obtained by any dyer or manufacturer by addressing the publishers.

The Color Printing of Carpet Yarns. By David Paterson. London: Scott, Greenwood & Company. Price $4. This book has recently been published, as a useful manual for color chemists and textile printers, with 17 illustrations. The character of the book may be judged somewhat from its contents, containing chapters on: Structure and Condition of Wool Fibre; Yarn Scouring; Scouring Materials; Water for Scouring; Bleaching Carpet Yarns; Color Making for Yarn Printing; Color Printing Pastes; Color Recipes for Yarn Printing; Science of Color Mixing; Matching of Colors; "Hank" Printing; Printing Tapestry Carpet Yarns; Yarn Printing; Steaming Printed Yarns; Washing of Steamed Yarns; Aniline Colors Suitable for Yarn Printing; and Glossary of Dyes and Dyewares, Used in Wool Yarn Printing.

Fashion Colors on Woolen Cloth. This is the title of a pattern card issued by the Farbenfabriken of Elberfeld Co., New York City, giving directions how to use the colors referred to.

The Prevention of Factory Accidents. By John Calder. New York: Longmans, Green & Company. Price $2.50. This is an account of manufacturing, industry and accident, and a practical guide to English law and the safe guarding, safe working and safe construction of factory machinery, plant and premises. The work is chiefly devoted to an endeavor to give a series of specially drawn illustrations to bring into relief the various devices which the author has found to be of service in accident prevention, the statutory obligations regarding which are very onerous. The character of the work may be understood by reference to the titles of several of its chapters: Legislation on Accident and Safety; Employers' Liability for Accident; The Workmen's Compensation Act, 1897; The Causes of Factory Accidents; Safe Guarding Prime Movers, Mill Gearing, etc.; Aid in Case of Accident. The book is illustrated with 124 diagrams.

The Cling-Surface Manufacturing Company, Buffalo, N. Y., have issued an illustrated circular of belts that are running with "Cling-Surface" applied to them. The illustrations include those of belts running in the John Hancock Building, Boston, Mass.; by the Brown, Durrell & Company, Boston; Lion Brewery, Buffalo, N. Y.; Marlboro Electric Company, Marlboro, Mass.; Gorham Manufacturing Company, Providence, R. I.; Union Dry Dock Company, Buffalo, N. Y.; Home Electric Light & Power Company, Elkhart, Ind.; and New Jersey State Reform School, Jamesburg, N. J.

Motors and Generators. This is the subject of Bulletin S, superseding Bulletin F, issued by the B. F. Sturtevant Company, Boston, Mass., referring particularly to 4-pole motors and generators for direct current. This bulletin is illustrated with descriptive matter and tables, and should be sent for by those interested in such machines.

Condensers. This is the title of a monograph, being a series of lectures and articles on this subject, reprinted from the columns of "Power," published by the Power Publishing Company, New York. Mr. F. R. Lowe, one of the editors, is the author. Price 50 cents.

The Rusden Machine Company, Warren, R. I., manufacturers of bleaching, dyeing, printing and finishing machinery, have issued a calendar for 1900, with a very handsome photograph of the sloop Columbia. Send for one.

The Yale Review. The Yale Review Publishing Company, New Haven, Conn. The February issue of this quarterly journal for the scientific discussion of economic, political and social questions, has just been received, with a valuable contents on the following subjects: Influence of the Trust in the Development of Undertaking Genius; Recent Works on Russian Economic Conditions; The Fourteenth Amendment in the Light of Recent Decisions; Rural Sanitation in England; Experience of the Dutch with Tropical Labor. I. The Culture System. This quarterly is edited by A. T. Hadley, president of Yale University, assisted by a number of professors. The Review is committed to no party and to no school, but only the advancement of sound learning. It aims to present the results of the most scientific and scholarly investigations in political science.

Gear Cutting Machine. The D. E. Whiton Machine Co., New London, Conn., have issued their 1900 catalogue of their moderate priced gear cutting machines for textile manufacturers. It contains illustrative descriptions of several new features which have been added to their machines, and also describes their new semi-automatic. A copy of the catalogue may be had upon application.

Modern Methods. The Link-Belt Machinery Co., Chicago, Ill., have issued an interesting pamphlet containing a series of views showing different installations of conveying apparatus successfully employed in different branches of business. Inspection of their literature suggests labor and time-saving opportunities which are not appreciated by manufacturers.

Industrial News.

Dye Sticks.

Frank Bailey of Cedar Brook, N. J., manufacturer of all kinds of dye sticks and poles, has just completed an addition to his works, which he has fitted up with steam power and modern machinery for planing, sawing and turning, especially designed for his business, which includes the manufacture of all kinds of sticks for dyeing machines, round, square, oval, flat, tapered or straight, singed or dressed to suit all grade of yarn. He furnishes sticks with or without copper ferrules, such as are used on the Klauder-Weldon or any other machines on the market.

Besides dye sticks, Mr. Bailey supplies all sorts of bleach and sulphur house poles of any style and with the best possible finish.

For the past ten years he has carefully studied the requirements of the trade in this direction and having made a specialty of it, has gained a high reputation for this class of goods and counts among his patrons many of the best textile establishments all over the country. Those who are not familiar with his goods and prices would do well to correspond with him.

—C. H. Brown has retired from the firm of C. H. Brown & Co., Fitchburg, Mass. The business is continued by his sons, Charles H. Brown, Jr., and Frank E. Brown, under the old firm name of C. H. Brown & Co., and they will continue to manufacture Brown steam engines of the same high grade and excellence of design and workmanship, maintaining the high reputation held by the firm for so many years past.

—The Berlin Iron Bridge Co., of East Berlin, Conn., are putting up two large buildings for the National Coal Car Co., at Everett, Mass.; a gas plant for the Peekskill Gas Co. at Peekskill, N. Y.; a retort house for the Penn Yan Gas Light Co. at Penn Yan, N. Y.; a large car barn and power house for the electric railroad at Montville, Conn.; the iron roofs for the new plant of the Nichols Chemical Co., at New York; two large buildings for the J. H. Horn & Sons Co., at South Lawrence, Mass.; a machine shop for the Wheeler & Wilson Mfg. Co., at Bridgeport, Conn.; a power station at Tariffville, Conn.; a new machine shop for the Norwalk Iron Works at South Norwalk, Conn.; a large steel building covering pier No. 13 at New York; a power house for the Middletown Gas and Electric Co. at Middletown, N. Y., besides a large number of smaller contracts. They are running their plant full time, and report business exceedingly brisk.

—The Acushnet Mills, New Bedford, Mass., are now erecting speeders supplied by the Howard & Bullough American Machine Co., Pawtucket, R. I.

—The Cling-Surface Mfg. Co., of Buffalo, N. Y., has just been incorporated under the laws of the State of New York, retaining the same name as heretofore, with Albert B. Young as president and general manager, and Wm. D. Young, vice-president and secretary. The past year has been the most prosperous in the history of the company and the demand for "cling-surface" they report to be increasing steadily. They have now three branches, one each in Boston, New York and Chicago, with others just opening in St. Louis and New Orleans, while the well known importing house of W. J. Moxham & Co., of Sidney, Australia, has ordered a large shipment of Cling-Surface with the exclusive right to handle it in Australia.

—At the annual meeting of the stockholders of The Berlin Iron Bridge Company, held at the office of the company in East Berlin, Conn., on Monday, the 29th, the capital stock was increased to $750,000.00. The following board of directors was elected: Chas. M. Jarvis, Frank L. Wilcox, S. H. Wilcox, H. H. Peck, Geo. H. Sage, D. E. Bradley and Seymour N. Robinson.

—The Union Cotton Mills, Union, S. C., have placed a repeat order for picking machinery with the Howard & Bullough American Machine Co., Pawtucket, R. I.

—The Sycamore Mills, Sycamore, Ala., have placed a further repeat order for spinning frames with the Howard & Bullough American Machine Co., Pawtucket, R. I.

New England Office.

Mr. Alexander D. Morgan has been appointed resident manager for the New York Blower Co. in the New England States, and has opened an office in the

fine, new building at 185 Summer St., Boston, directly opposite the South Terminal Station. Mr. Morgan is well known in the blower business, having been for the past 15 or 20 years connected with the Boston Blower Co., and is thoroughly familiar with the problems which are presented in this line of work.

Health an Element in Production.

We think that manufacturers do not often realize the direct bearing which the health of their employees has upon the quality and quantity of work. When an epidemic strikes a mill town and the operatives are laid off by the dozens, the question is brought home forcibly, but when they are at their work, it may not be fully appreciated that the fact of their feeling well or miserable and consequently the way they do their work may depend more or less upon their surroundings. Operatives themselves naturally prefer working in factories where the conditions are most healthy. A bright, cheerful room is an important adjunct to an operative's health, besides giving proper light, and in connection with that attention is called to X X Muresco, which is used for whitening the interior of mill buildings. We understand that it contains no acids of any kind, and is, therefore, sanitary. It dries hard and perfectly flat, giving a soft, silky appearance that is pleasing and restful to the eye, and a very important fact is that it is fire-proof.

This article is manufactured by Benj. Moore & Co., of Brooklyn, N. Y., and Chicago, Ill., who, upon request, would be pleased to give full information about it, and refer to many large mills where it is used.

—The Berlin Iron Bridge Co., of East Berlin, Conn., have just completed two large highway bridges at Long Lake, N. Y., and are now putting up a 200 ft. span at Stuyvesant Falls, N. Y.; a large highway bridge at Hillsborough, N. H., and a two-span trolley bridge across the Naugatuck river at Waterbury, Conn.

Bullet-Proof Cloth.

It would seem as if Casimir Zegien ought to find the present unpleasantness in South Africa a promising opportunity for the use of his bullet-proof cloth, which has been subjected to such severe tests in Chicago. We have in previous issues published a description of this fabric and mentioned some of the severe tests to which it has been subjected by army and police officials. The Zegien Bullet-Proof Cloth Co., 88 State St., Chicago, Ill., issues a little circular on the subject, describing some of these tests.

—The cotton yarn mill which supplies warp for the big Sanford Carpet Works at Amsterdam is a model mill. It contains 5000 spindles and has a first-class and up-to-date equipment in every respect, and gets out a large quantity of good quality. It is under the able management of Mr. Wall, assisted in the spinning department by M. E. Schedlbauer.

Fire Hose.

The Boston Belting Co. have a special catalogue and price list on fire hose, which covers this subject exhaustively. Their Underwriters' hose has been carefully tested by the Associated Factory Mutual Insurance Companies, which require that all such hose for outside use shall not burst at less than 400 lbs. pressure for a medium weight, rubber-lined cotton hose. Their Underwriters' cotton hose fulfils all these requirements. It has an extra heavy, pure, smooth lining, while for inside use and other locations where hose is kept in dry places, they make a first-class unlined linen hose, which is cheaper, lighter and more easily handled than a rubber-lined hose.

Besides the hose business, they handle all the auxiliary supplies, such as nozzles, couplings, racks and complete outfits.

Their catalogue contains some valuable tables and information relative to this subject, and should be filed for reference in mill offices.

—A recent visitor to the Eagle and Phoenix Mills at Columbus, Ga., writes that "they are turning out a product that for its kind cannot be excelled by any mill in the North, and that there are as fine a set of men at the head of the establishment as anywhere in the world."

Pocket Map of South Africa.

We have received, with the compliments of F. E. Atteaux & Co., the well-known manufacturers and dealers in colors and dyestuffs, 174 Purchase St., Boston, a pocket map of the seat of the war in South Africa. It is one of the best and clearest war maps that we have seen, and seems to be much more up to date than most. It is handsomely engraved in colors, and also contains a brief history of the South African republic and causes which led up to the war. It is a convenient size for the pocket, and is very useful for reference.

"A Message to Textile Manufacturers."

Under the above title, the Warren Mfg. Co., 26 Jackson St., Chicago, Ill., issue a circular which explains at length why the Warren pulley cover is being so largely adopted by American textile manufacturers.

There are two methods of preventing pulleys from slipping. One is by using a dressing of some kind on the belt, and the other method is by covering the pulley. The Warren pulley cover belongs to the latter class, and has proved very satisfactory in practice. It is a perfect substitute and great improvement over leather lagging, and we find is in satisfactory use by some of our largest mills.

In their advertisement on another page striking testimony is presented in the telegraphic orders received from the Lancaster Mills of Clinton and the American Linen Co. Besides them, they count among their long-time customers such mills as the Union Wadding Co., and Slader Cotton Co., of Pawtucket; R. & H. Simon Silk Co., of Easton, Pa.; The Catskill Knitting Mills of Catskill, N. Y.; A. V. Morris & Sons, Amsterdam, and the Merchants Mfg. Co., Fall River.

No class of manufacturers understand

better the importance of belts that do not slip than the textile mills. Slipping belts mean variation of speed and consequent unevenness of yarn. Tight belts are almost as great an evil as slipping belts, and the proper solution of the problem lies in the adoption of some approved method of preventing these evils, and the Warren Mfg. Co. claim that their pulley cover is the right way to do it.

Electrical Work.

The Philadelphia Electrical Construction Co., Hale Bldg., 1328 Chestnut St., Philadelphia, are general contractors for all sorts of electrical work and devices. They install mill telephone systems, private lines inside and outdoors, and are agents for the Eco-Magneto system of watchmen's time detectors, which is so widely employed. They also supply employees' time registers. They undertake the whole contract for this class of work, supplying the necessary apparatus and doing the wiring, and can undertake work in any mill towns and cities, not being confined to Philadelphia. There is hardly a mill but what has more or less of this sort of work to do, and this concern would be glad to submit estimates.

The Eco-Magneto time detector is perhaps the most generally employed of any system of checking watchmen. It has been approved both by stock and factory mutual insurance companies, and offers a safeguard which cannot be successfully tampered with.

Structural Material.

Attention is called to the advertisement of The Berlin Iron Bridge Company of East Berlin, Conn., which appears in our advertising pages. The company announce that they have a very large stock of structural material, consisting of beams, channels, angles, etc., in stock at East Berlin, Conn., and consequently are able to furnish on very short time, steel bridges, buildings, roof trusses, etc. As this class of material is very difficult to obtain at the present time, it may be of interest to some of our readers, who contemplate additions to their plant, to communicate with The Berlin Iron Bridge Company.

Moisture Gauges and Hygrometers.

Aug. Neubeck & Co., 92 Fulton St., New York, carry a full line of testing instruments, such as the above and thermometers, barometers, etc. The instrument listed in their advertisement is a very useful one in every spinning room. It is called "Lambrecht's Patent Polymetre, and is an instrument to show the percentage of moisture contained in the atmosphere and on the dial in plain letters are the words "Too Dry," "Normal" and "Too Moist" so that the overseer can tell at a glance what the condition of his room is. In combination with this is a thermometer, so that the same instrument shows the temperature and humidity.

They have several styles of wet and dry bulb hygrometers, electric alarm thermometers, which are set to ring a bell when the temperature falls below or rises above a given point, also alkali testers and all such instruments for dye house use.

Their circular may be had upon application.

Direct Selling Agent.

Mr. H. Hirschman, 419 Broome St., New York, whose advertisement appears for the first time in this issue, has been very successful in selling the jobbing and department store trade. He now desires a few reliable mill accounts, and believes that with his years of experience and acquaintance in the trade, he can give satisfactory attention to mills wanting a direct selling agent in New York City, especially those in South and West. His specialty is hosiery and underwear accounts.

The American Moistening Company.

The American Moistening Company, Boston, Mass., report a continued increase in their business, having in hand large orders from the representative cotton, worsted and silk mills, as well as knitting mills. The advantages of this company's system of humidification are such as guarantee results not only for quality, but increase in production, maintaining as well sanitary conditions beneficial to the work people.

The company have received repeat orders for humidifiers from the Gaffney Manufacturing Company, Gaffney, N. C.; Monroe Cotton Mills, Monroe, Ga.; The New York Mills, New York Mills, N. Y.; The Atlantic Mills, Providence, R. I.; and the Anderson Cotton Mills, Anderson, S. C.

The company have received an order for a complete equipment of humidifiers from the Daniel Manufacturing Company, Lincolnton, N. C., and from Robert Beatty & Company, Philadelphia.

The Harrison & Gore Silk Company, Newburgh, N. Y., have adopted this company's system of humidifiers.

The Other Day a Man Was Met,

carrying what appeared to be a stick of dynamite. He turned out to be a representative of the Stephenson Mfg. Co., Albany, N. Y., and when confronted protested that it was not dynamite he was carrying, but a bar of Stephenson's belt dressing. One of the most significant claims is that his company is never obliged to solicit a continuance of business. He says that in the two years he has been with them he has seldom lost a customer, and his main work is to induce new people to try it. This does not require much effort, however, for samples are furnished for trial on application in person or by letter, so it is simply a question of getting around to the trade, and Mr. Parsons contends that eventually every belt user in the United States will be using the Stephenson bar belt dressing. It is called "bar" dressing because of its shape, being put up in round bars and covered with paper. It is a nearly solid dressing, feels oily to the touch and has a somewhat oily smell. It is applied simply by removing the paper from one end and holding the bar against the moving belt. These bars two inches in diameter and nine inches long, weigh one pound, and are boxed for shipment in lots of 12, 30, 50 and 100 pounds. Stephenson's belt dressing has been on the market since 1888, and the records of the company show not only a steady and absolutely certain increase each year, but a large one as well. The

claims made for this dressing are that it cleans and preserves leather belts, will not injure rubber or cotton belts, and causes all to adhere more firmly to the face of the pulley, thus preventing slipping. Belt slipping is the cause of a greater money loss than most people imagine, though students of the application of power are aware of the importance of keeping belts clean, smooth and pliable, and if possible, increasing their frictional resistance. Belt dressing is claimed to do all this. Take belts that are dirty, dry, not in condition, and the loss of power in the transmission will often be from 20 to 30 per cent. A good belt dressing will save from a part to all of this loss. There is no need to convince a good loom fixer of the value of belt dressing, as he knows he cannot run his looms properly without it. On the picking motion if the belt slips at all, it will do it at a critical moment, and a stick of Stephenson's dressing near at hand can be instantly applied without danger of spattering on the warp. The company wishes it distinctly understood that the Stephenson dressing contains no rosin whatever. Belts on which it is used gradually become soft and pliable, giving the same result as taking off from the pulleys and carefully treating with neatsfoot oil. For the Stephenson belt dressing especial economy is claimed, and that for the service obtained the cost per pound is about half that of other dressings. It is not necessary to apply frequently, the quantity and the number of applications depending on the service. They will send samples sufficient to give a thorough trial to anyone interested.

—The Superior Knitting Company, Hoosick Falls, N. Y., have added to their plant a number of Stafford & Holt's knitting machines, and further additions of these machines will be made in the early future.

—The John Hope & Sons Engraving & Manufacturing Co., Providence, R. I., have been very busy of late, installing their latest improved pantagraph machines for engraving copper rollers in the Colonial Printing Works at Montreal and have also been filling orders from the American Printing Co., Fall River, Mass., and from various other printing concerns for these improved machines. They have been adding machinery, as well, to their own plant, a new, finely equipped and up-to-date establishment, and they have also recently made important improvements to their mill engraving machines.

—The Proximity Cotton Mills, Greensboro, N. C., recently ordered 500 galvanized iron dye house cans of the Charlotte Supply Co., made by the James Hill Mfg. Co., of Providence, R. I., who make a specialty of such cans for dye houses, as well as vulcan fibre roving cans for the cotton mills, which establishments have kept them pretty busy of late supplying their wants.

Sheldon's Publications.

J. D. Sheldon &' Company, Leonard Street and West Broadway, New York, have just issued their 1900 editions of their several publications, known as the "Buyers' Reference Book," comprising chapters for dry goods and kindred manufactures, commission merchants, importing agents, etc.; "Jobbing Trade," comprising chapters on dry goods, notions, furnishing goods and millinery; "Retail Trade," comprising representative retailers; "Export Trade," comprising buyers for foreign markets; "American Products," comprising sellers for foreign markets; and "Trade Reporter," which is issued monthly, at $1 per annum. These are all referred to in our advertising columns, to which we invite attention.

American Loom Co.

John E. Searles has completed arrangements for the consolidation of the Universal Loom Co. and the Readville Machine Works. The new company will be called the American Loom Co., and the certificate of incorporation was taken out in New Jersey on Feb. 27 with a capital stock of $1,000,000. The following statement was given out by Mr. Searles regarding the new company:

The American Loom Co., organized under the laws of the State of New Jersey, is to take over the patents and business of the Universal Loom Co. and also all the property of the Readville Machine Works of Readville, Mass. The new company will own all the patents of H. I. Harriman for the new automatic looms now being built by the Readville Machine Works, and with the new capitalization will be equipped with an ample cash working capital to meet the demands of the business, which is developing very rapidly.

Orders are already in hand from several of the principal mills in New England, as also some of the Southern mills.

The officers of the company are John E. Searles, president; William C. Lovering, vice-president; H. I. Harriman, secretary, and J. Foster Searles, treasurer.

Cling-Surface in Upright Belts.

Many textile belt users who have seen the slack belt pictures published by the Cling-Surface Mfg. Co. fail to realize that the principles involved there apply also to their upright belts. A horizontal belt is only slack because it has stopped slipping, yet, while a vertical belt cannot run slack because it would drop away from the lower pulley, it can run easy, just snug enough to fit the pulleys yet free of all strain except the transmitting load. The cure of slipping is the key to all the rest.

The Cling-Surface Mfg. Co. report that, where a mill once uses Cling-Surface, they become permanent customers, still mill owners fear that Cling-Surface, like the many belt dressings they have tried, will injure their belts.

The Cling-Surface Co. say they have letters from Fraser & Chalmers; Erie R. R.; Adams & Westlake; Stewart Heater Co.; Wagner Palace Car Co.; R. Hoe & Co., of printing press fame; Pierce Bicycle Co. and many prominent firms who have used Cling-Surface for three to four years, yet are steady customers. Copies of these letters they will send to any one in doubt.

American Cotton Yarn Exchange.

The new offices of the American Cotton Yarn Exchange, Arnold B. Sanford, president and manager, 67 Chauncy St., Boston, are most attractively fitted up for the special requirements of its business, and consist of a reception room, a large inner private office and a working room. The sample cases have been especially designed and are models in their way. The product of each mill handled by the Exchange is properly grouped under the mill's number, and the range of yarns shown seems to cover every requirement of the converter and weaving or knitting manufacturer. A separate case contains a beautiful line of mercerized yarns, and necessary yarn testing and measuring instruments are conveniently at hand. The office is a pleasant place for manufacturer or buyer to drop in, and he can learn all about the cotton yarn market.

The American Cotton Yarn Exchange is handling the product of three new combed yarn mills, in which Mr. Sanford is interested, viz., Clover Mill, S. C.; the new Richmond Cotton Mill at Chattanooga, and the New Hampshire Spinning Co. at Penacook. All of these mills were contracted far ahead, before a spindle was started. The Clover and the New Hampshire mills are almost ready to go into production, and the Richmond will soon follow.

Mill for Sale.

Attention is called to the advertisement of W. L. Elder, 1 Ingalls Block, Indianapolis, Ind., who has for sale a 4-set mill. We learn that the machinery is in very good condition and that the plant is well balanced and well equipped. There has been such a demand for good properties that this plant ought not to go begging. The fact that it is in the Middle States is no reason why it cannot be operated to good advantage under Eastern management, as a number of good paying woolen mills in the West are controlled in the East.

The Smethurst Roving Gear.

George Smethurst of Maynard, Mass., is meeting with success in the introduction of his improved roving gear. There has not been a single instance where this gear has been introduced that Mr. Smethurst has had any report of dissatisfaction. On the contrary, when a sample gear has been placed on trial, it is usually followed by an order for a full set. He makes a twist gear as well as a roving gear, and as the price is very reasonable and the merit of the device unquestioned, it would seem as if any mill which has not yet given them a trial, would do well to send for a sample gear ($3) or wishing to know more about them before ordering a sample, Mr. Smethurst would be glad to send a descriptive circular.

—New York, Little Falls. It is reported that John McCauley, who operates the Beaver Knitting Mill, is negotiating for the Hudson River Knitting Mill, which has been idle for some time, for the purpose of equipping the plant to manufacture his own yarn. No decision has been reached.

MILL NEWS.

Cotton.

New Mills.

—*Alabama, Huntsville. It is stated that T. B. Dallas, president of the Dallas Cotton Mills, contemplates erecting another cotton mill, with 25,000 spindles and 750 looms, near the present one.

—*Alabama, Mobile. The new Barker Cotton Mill Co., capital $400,000, expects to begin operations about September, making 3-yard 36-inch sheetings and 30-inch drills. The plant will be equipped with 20,000 spindles and 600 looms. Steam power will be used. George G. Barker is president; Francis H. Hills, vice-pres. and treas.; Z. M. P. Inge, sec. and F. S. Mosher, general manager. No selling agents yet selected.

—Alabama, Monteville. W. B. Reynolds is now interested in the organization of a company to erect a spinning mill.

—Alabama, Ozark. The G. P. Dowling Hardware Co. is now receiving estimates on complete equipment for cotton rope mill which they contemplate erecting.

—Alabama, Roanoke. The W. A. Handley Mfg. Co. has been incorporated with a capital stock of $100,000 by Capt. Handley, R. L. Schuessler, Z. J. Wright and Hill Jones. A large cotton mill may be erected.

—Alabama, Talladega. W. M. Franks and Lanier Brothers are promoters of a new cotton mill enterprise at this place. They are now corresponding with a number of cotton mill machinery manufacturers, relative to equipment of same.

—*Alabama, Uniontown. Over $50,000 has already been subscribed toward the $75,000 required for the erection of the proposed Ella White Cotton Mills. Negotiations for machinery are in progress, and a site has practically been decided upon. J. H. White, J. C. Welch, Julius Marx, W. H. Taylor, and S. T. Whitfield have been elected board of directors.

—*Arkansas, Dardanelle. The Dardanelle Cotton Mill has been incorporated with a capital stock of $100,000 with W. H. Gee, president; C. B. Cotter, vice-president and J. D. Kennedy, secretary, treasurer and general manager. We gave detailed report of the mill in issue of Nov. 3rd, '99.

—*Arkansas, Fort Smith. E. G. Cole writes us that he is now looking up a location and making investigations for the purpose of building a cotton factory, or a cotton-seed oil mill, or both. No contracts have yet been placed, and will not until he has decided where he will locate.

—*Georgia, Atlanta. The Elizabeth Cotton Mills, whose organization we reported last week, will be a hosiery yarn mill with 5000 spindles, steam power. The exact location has not been determined, but it will be near Atlanta. A charter will be granted about March 10, and officers will then be chosen, and they expect to commence building about March 15. We believe that the cotton machinery has been arranged for, but the sprinkler and air moistening system, power transmission, electric lighting, blower work, and general supplies are not yet contracted for. F. I. Stone, Atlanta, can be addressed.

—*Georgia, Atlanta. The Scottdale Mills is the name by which the new plant to be erected by the Scott Investment Company will be known. The mill will be 400 feet by 75 feet, and will have two ells 50 feet in length. As previously reported, the mill will have an equipment of 10,000 spindles and 300 looms. George A. Gray, who now holds position of president of three cotton mills now located in Gastonia, will assume full management of the mill when put in operation, which they expect will be about October 1st. Export sheetings will be the goods manufactured. Employment will be given to about 300 hands. Bids are now being received for the necessary machinery, etc.

—Georgia, Atlanta. Baynard Willingham, O. D. Woestman and others have made application for a charter for the Piedmont Cotton Mills, with capital stock of $50,000.

—*Georgia, Canton. The main building of the Canton Cotton Mills, recently organized, will be two stories, 80x240 feet, and will be equipped with 5000 spindles and 100 looms, for manufacturing four-yard goods, with daily capacity of 7500 yards. About 100 operatives will be given employment in the plant, of which R. T. Jones is president and general manager. About $125,000 will be invested in the new enterprise.

—*Georgia, Douglassville. The Georgia Western Cotton Mills will be reorganized as the New Century Cotton Mills. This mill will be equipped with 20,000 spindles and 500 looms. J. S. James holds the office of president.

—*Georgia, Pickens Co., Jockey. T. W. Dowda is considering starting a small yarn plant to spin about 500 lbs. of cotton per day. He now has a grist mill and good power and a building, and wants to get an estimate on cost of machinery. He thinks he will make ball thread and bunch thread. No definite steps have yet been taken, and he is seeking necessary information before deciding what he will do, and wishes to know cost of equipment.

—Georgia, Monroe. The Monroe Guana Company, manufacturers of guanos, acids, meal, etc., is to erect a large cotton mill here. The capital stock of the company will be increased to $200,000 for this purpose. C. E. Mobley, secretary and general manager of the company, is the prime mover in the new enterprise. A separate company will very likely be formed.

—*Louisiana, New Orleans. It is reported that nearly $35,000 has been subscribed toward the new cotton mill, about which we made mention some time previous. Gustave Lehmann, J. D. Blakemore, A. R. Blakely, S. Odenheimer and John Mason are among those interested in the new enterprise.

—*Georgia, Pelham. Work will start on erection of the new plant for the Pelham Mfg. Co. as soon as the contract for the building is let. Power and cotton machinery equipment has been contracted for, but the minor contracts of shafting, pulleys, electric light plant, etc., are still open. It is the intention of the company to have the plant completed in time for the next crop.

—Georgia, Richland. A committee has been appointed at this place to solicit subscriptions for the purpose of erecting a cotton mill. About $6,000 have been subscribed toward the new enterprise, which has been temporarily organized as the Richland Cotton Mills Company. Mayor B. H. Overby is interested.

—*Georgia, Toccoa. The Capps Cotton Mill has been organized with a capital stock of $50,000. T. A. Capps, president; W. C. Edwards, vice-president. This is the plant which we previously reported would probably be in operation by next September, operating 5000 spindles, manufacturing yarns.

—Illinois, Garden Prairie. The Sackett Wired Tag Co. are going into the manufacture of separator belts for milk separators, woven from soft cotton cord or twine, which they will buy.

—Maryland, Baldwin. The Baldwin Mfg. Co., John Lawrence and Thomas Corr, proprietors, is a new concern which will operate a plant manufacturing upholstery goods, curtains and table covers. The plant will be started with about 15 looms.

—*Massachusetts, Easthampton. Plans are now being prepared for a large building, 100 by 700 feet, two and three stories high, to be erected by the Hampton Co., now using the No. 1 mill of the West Boylston Mfg. Co. The new plant will be used exclusively for manufacturing cotton yarns. The present mills of the old Williston plant are being thoroughly overhauled and largely refitted.

—Mexico, Torreon. A company, which has a capital of $1,200,000, is to erect a cotton mill at this place, in the Nazas River cotton growing region.

—Michigan, Kalamazoo. The Spiral Mfg. Co. has been incorporated with capital stock of $5000 by E. Lehman, J. B. Lehman, Charles E. Thompson and Charles H. Thompson. The new company will engage in the manufacture of suspenders, supports, waits and garters.

—Mississippi, Holly Springs. Regarding the cotton mill at this place reported last week, we learn that the subscription has only recently been started, and it has not yet progressed far enough to predict the result. The capital stock will be $100,000. No definite plans have been made as to what the mill will make or its capacity.

—*New York, Cohoes. The Walker & Harp Mfg. Co. has been incorporated for the manufacture of all grades of cotton batting. They are now building an addition to the present building, and expect to begin production about April 1st, using steam power. There will be a bleach house. Joseph A. Leggett is treasurer; James Walker, superintendent, and Herbert S. Harp, selling agent.

—New York, Oswego. It is reported that Frederic Conde, who recently purchased the Washington Mills site at this place, contemplates erecting a large yarn mill, to supply yarn for his knitting plant.

—North Carolina, Albermarle. The Efird Mfg. Co. will increase their capital stock ($100,000) to $200,000 for purpose of erecting a new mill near present one, for making hosiery yarns on cones. The new plant will be equipped with 5000 spindles.

—North Carolina, Candor. The Capelsie Cotton Mills have been incorporated here with a capital of $40,000 by A. W. E. Chapel, J. G. Tomlinson, D. D. Benton, Thos. A. Graham and D. A. Parsons. It is hoped to have the plant in operation by October, 1900.

—*North Carolina, Charlotte. The plant of the Magnolia Mills, which was formerly used in making narrow fabrics, back bands, etc., will be started about May 1st, in the manufacture of soft yarns. Three thousand spindles will be installed.

—North Carolina, Clayton. It is reported that a company has been organized here, with Ashly Horne as president, and a capital stock of $75,000, to build a cotton mill.

—North Carolina, Concord. Trueman Chapman, of this place, is interested in the organization of a company for manufacturing a fine grade of yarns, from 30's up and is now geeting estimates on the requisite machinery. The proposed plant will have 6,000 spindles when completed.

—*North Carolina, Enfield. Articles of incorporation are now being drawn up for the new cotton mill which will be erected here with a capital stock of $75,000. It is expected that about $40,000 will be raised by local capitalists. W. H. McDonald was appointed chairman of the committee to solicit subscriptions.

—*North Carolina, Gastonia. G. W. Ragan is president and treasurer, and L. L. Jenkins, vice president, of the Arlington Cotton Mills, recently incorporated here with a capital stock of $130,000 to build a 6,000 spindle plant.

—*North Carolina, Henderson. The new cotton mill at this place will be known as the Harriet Cotton Mills, with capital stock of $150,000. Work will soon be started on erection of the plant, which will be equipped with 7,500 spindles. D. Y. Cooper, J. D. Cooper, G. B. Harris, J. B. Owen and others, are interested.

—*North Carolina, Lexington. The new cotton mill at this place, about which we have made previous mention, and in which we reported that J. F. Hargraves, G. W. Montcastle and D. H. Hinkle, were interested, has been chartered as the Nokomis Cotton Mill. The capital stock of the company will be $100,000, with privilege of increasing to $500,000. The plant will be a spinning and weaving mill.

—*North Carolina, Lowell. The Lowell Cotton Mills have been incorporated with a capital stock of $75,000; H. M. McAden, president; J. C. Rankin, vice-president and S. M. Robinson, secretary and treasurer. This project was mentioned a short while ago.

—North Carolina, Rutherfordton. It is reported that work has commenced on construction of the cotton weaving mill at this place by the Lovelace, Coxe & Hume Co.

—*North Carolina, Smithfield. The new cotton mill at this place has been formally organized as the Smithfield Cotton Mill, with a capital of $100,000. Allen K. Smith will be president, and S. S. Holt, secretary and treasurer. Among the directors are: W. L. Goodall, J. A. Wellons, E. J. Holt, J. W. Stephenson and W. M. Sanders. As previously reported, this plant will not be ready for machinery until next autumn.

—North Carolina, Troy. A. W. E. Capel is president and J. G. Tomlinson, treasurer, of the Capelsie Cotton Mills, which were recently organized with capital of $50,000. The plant, which will be equipped with 2500 spindles, and will be operated by steam and water, will be used in manufacturing yarns, giving employment to about 100 people.

—North Carolina, Washington. A company, in which Dr. S. T. Nicholson and William Bargaw will be interested, will be organized for the purpose of building a $50,000 cotton factory. The requisite capital has been secured.

—*Pennsylvania, Chester. The Houston Mfg. Co., with capital of $10,000, H. K. Houston, president; C. M. McCloud, treasurer and A. L. Atlee, superintendent, is the name of the new concern about which we made mention in a previous issue. They will manufacture quilts of all kinds and will sell the goods direct.

—*Pennsylvania, Wilkesbarre. The Sun Narrow Fabric Co., which we reported in a previous issue had applied for a charter, has been incorporated with a capital of $15,000; E. P. Phillips, president; W. H. Skeat, treasurer and H. Mattershead, superintendent. The plant, which will be located corner Horton St. and Plymouth Ave., will be operated by steam, and begin running about 15th of March. A dye house will be attached. They have not fully decided on the number of looms, but inform us that they will start on a small scale, gradually increasing.

—*South Carolina, Blacksburg. The Blacksburg Mill Company has made application for a charter for the purpose of operating a cotton mill. This is the concern in which S. Wittkowsky is interested.

—*South Carolina, Cheraw. H. P. Duvall, H. W. Finlayson, A. L. Evans, R. M. McKay, W. R. Godfrey, B. T. Gaston, and W. D. Malloy have incorporated the Cheraw Cotton Mills, with capital stock of $100,000.

—*South Carolina, Chester. The new mill to be erected at this place, and about which we gave data in a previous issue, will be known as the Wiley Mills Company, with capital stock of $100,000. It is expected to have the new plant in operation by the first of October. George A. Gray, of Gastonia, is president, and Thomas H. White, of Chester, secretary and treasurer of the new concern.

—*South Carolina, Dillon. T. B. Stackhouse has been elected president, W. M. Hamer, secretary and treasurer and Charles Iceman, manager of the new Dillon Cotton Mills, about which we have made a previous report.

—*South Carolina, Gaffney. At a recent meeting held by the stockholders of the Limestone Manufacturing Company, recently incorporated with a capital of $100,000, to erect a cotton mill, James A. Carroll was elected president, J. Q. Little, vice president, W. C. Hamrick, secretary and treasurer, and E. R. Cash, manager.

—South Carolina, Greers. Frank Burgess, T. Cunningham, T. E. & W. B. Smith and J. A. Robison are interested in the movement here for a 5000-spindle yarn mill.

—*South Carolina, Leesville. We have been advised by F. Hampton Hendrix, secretary of the Leesville Mfg. Co., that they intend raising $100,000 for erecting a cotton mill, and if that amount is easily secured to increase the same to $200,000 and build accordingly. No contracts have yet been placed for the plant which will be operated by steam power. J. L. Matthews, is treasurer and not L. G. Bouknight, as reported in our previous issue.

—*South Carolina, Liberty. We have been informed by R. F. White, of Greenville, that work will not be started until May or June on erection of new cotton mill at this place.

—*South Carolina, Orangeburg. The Enterprise Cotton Mills, which we reported in a previous issue were for sale, will be completed and operated by the Orangeburg Manufacturing Company, which has recently been incorporated with a capital stock of $200,000. W. G. Smith has been appointed treasurer of the new organization. T. C. Duncan, of Union, S. C.; D. H. Moss, of Orangeburg, and W. G. Smith, of Bamberg, are among the incorporators. The plant is ready for the installation of 11,000 spindles and 350 looms, which the company will purchase and put in place.

—*South Carolina, Seneca. The Seneca Cotton Mills, which has recently been organized with a capital stock of $200,000, to build a plant for manufacturing cloth, will be equipped with 10,000 spindles, and 300 looms. The machinery, including a steam power plant, has not yet been contracted for. L. W. Jordan will hold the position of president and treasurer of the new concern.

—*South Carolina, Simpsonville. Alexander Finley has been chosen president of the $250,000 stock company incorporated by J. H. Todd, F. D. Hunter, S. T. Moore, and others, to build a cotton mill. The plant will have an equipment of 10,000 spindles and 500 looms.

—*South Carolina, Spartanburg. John A. Law has been appointed president and treasurer of the new Saxon Mills, about which we have given details in previous issues. Construction of the mill will be begun as soon as weather permits.

—*South Carolina, Sumter. Marshall & Co. advise us further that they will want full information as to machinery, etc. for making cheap cotton towels. They also wish to investigate the cost of machinery required for bleaching cotton goods. No machinery has yet been bought.

—*South Carolina, Williamston. Subscriptions are now being solicited toward the capital stock of the Williamston Mills, which were recently incorporated. It is proposed to have the plant equipped with 5000 spindles. George W. Sullivan will probably hold position of president and treasurer of the new concern.

—Tennessee, Chattanooga. At a recent meeting held by the Chamber of Commerce, it was decided to erect a $100,000 cotton mill. Subscriptions to the amount of $10,000 have already been received toward the enterprise.

—*Tennessee, Harriman. S. T. Paige & Co.'s large factory building at this place, has been purchased by North Carolina capitalists, who will establish a $150,000 cotton mill on the property.

—Tennessee, Knoxville. It is rumored that a $250,000 yarn mill will be built here by Col. C. M. McGhee. The plant will spin and weave.

—*Texas, Belton. A committee has been appointed, comprising J. Q. Allen, J. L. Wilson and Nelson Smith to take charge regarding the new mill proposed at this place and make further subscription solicitations. It is reported that about $25,000 has been secured so far.

—*Texas, Denison. The American Cotton Spinning Company, of which J. A. Smith is president, will not be in operation before March 1st. It was previously reported that the plant would probably be ready to start December 1st. The machinery is in and they are waiting for the engine.

—*Texas, Hillsboro. A recent report states that $40,000 has been subscribed toward the capital stock of the new mill to be erected at this place. A company will be organized about March 1st, with capital of $50,000.

—*Texas, LaGrange. The LaGrange Cotton Mill Co. has been organized with Hon. John C. Speckles, president; E. Frank Whitlow, secretary, and John Ehlinger, treasurer. Details of this mill were given in a previous issue.

—Texas, Waco. The Waco Business Men's Club has appointed a cotton mill committee, of which S. Hirschberg is chairman. The citizens will subscribe $100,000 for a cotton mill, but before doing so, want to get intelligent estimates on mill machinery and building, showing probable cost and possible profits. Mr. Hirschberg writes us that they want to interest with them an experienced manufacturer, who would be willing to take 10 or 15 per cent. of the stock of the com-

pany and manage the mill. He wishes to correspond with mill engineer and superintends who can invest.

—*Virginia, Norfolk. We learn that the building for the yarn mill to be operated by the Cotton Oil & Fibre Co., Norfolk Mills, has been erected, and most of the machinery has been delivered, but has not yet been installed.

Enlargements and Improvements.

—*Alabama, Talladega. The Highland City Mills are to increase the capacity of their plant to 5200 spindles.

—Connecticut, Killingly. Fifty new Whitin looms are being installed by the Attawaugan Company.

—*Georgia, Eatonton. J. W. Preston has been elected president, E. M. Brown, vice-president and treasurer, and A. S. Reid secretary of the new cotton mill to be built at this place, at a cost of about $75,000. The mill, which will be operated by electricity, will give employment to about 100 hands.

—*Georgia, Griffin. The Rushton Cotton Mills, of which J. P. Nichols is secretary and treasurer, are to build an addition to their new mill, now under construction. They will install new machinery, which is now being purchased by the secretary, in the annex. It is expected to have the main building in operation about the first of March.

—*Kansas, Independence. J. M. Haney, superintendent of the Kansas Cotton Mill Company's plant, is in the East purchasing machinery for a cotton bat factory, which will be run in connection with the twine mill.

—*Louisiana, New Orleans. The New Orleans Cotton Mills Co., of which Ernest V. Reiss is president; Harry E. Emmons, treasurer, and H. E. Elder, superintendent, confirm our report of their addition of 1600 spindles and 15 looms, which will be in production in about 60 days, making duck.

—Maryland, Oella. The capacity of the Oella Mills of W. J. Dickie & Sons is to be increased. Among the additions to the machinery are 4 sets of 60-inch M. A. Furbush & Son Machine Co.'s cards.

—*Massachusetts, Chicopee Falls. We have been informed by the Chicopee Mfg. Co. that the additions we reported in a previous issue will not be made at present, but they contemplate building later in the spring.

—Massachusetts, Fall River. Work has started on the erection of a new cotton shed 160x50 feet, one story high, with three compartments, by the Granite Mill, near the No. 3 Mill, on Seabury Street. The new mill will be furnished with the dry system of automatic sprinklers.

—Massachusetts, Lowell. An addition is being built to the raw stock dye house of the Tremont & Suffolk Mills. Four large machines, two hydro-extractors and two cotton dryers will be installed.

—*Massachusetts, North Abington. A large addition is to be built to the mill of A. C. Woodward, manufacturer of web goring.

—*Mississippi, Natchez. The Rosalie Mills, which have been purchased by the Natchez Cotton Mills Company, will be known as Mill No. 2. About $50,000 is now being expended for the installation of new machinery and other improvements, and the plant will have 10,578 spindles and 240 looms, when additions are completed.

—*New Hampshire, Nashua. Another addition 200x50 feet, three stories high, is to be built to the cloth room of the Nashua Manufacturing Company. This concern has been constantly building during the past two years.

—*New Jersey, New Brunswick. The present plans of Johnson & Johnson contemplate the enlargement of their absorbent cotton and gauze plant by an addition of about 3000 to 5000 spindles. The matter has not yet been definitely settled, and plans have not yet been drawn.

—*North Carolina, Gastonia. The Trenton Cotton Mills' addition will contain 3,000 spindles. They will break ground in April or May, and expect to begin production in November. They make yarns, 40's to 60's; steam power. Their manufacturing machinery is contracted for, but there are many incidentals which have not yet been arranged.

—*North Carolina, Salem. The South Side Mfg. Co., which we reported in a previous issue as installing additional machinery, inform us that 5376 new spindles and 68 new looms are to be added, giving the plant a total of 10,752 spindles and 168 looms. The full equipment of machinery will probably not be running before the middle of the year.

—*North Carolina, Wilmington. The Delgado Cotton Mill Company at this place, which recently commenced operations in the new plant, propose to largely increase the plant and double the mill's capacity.

—*Pennsylvania, North Wales. The addition which we reported in a previous issue was being made to the yarn plant has been finished. The name of the concern is the Fibre Spinning Company, and will manufacture a special kind of yarn by a patented process for the Acorn Web Works.

—Rhode Island, Georgiaville. Eighty-four new looms have been recently installed in the Vernon Mills. They will add 42 more, giving the plant a total of 346.

—South Carolina, Greenwood. The Greenwood Cotton Mills, now operating 10,000 spindles and 384 looms, contemplate doubling its equipment. W. L. Durst is president and treasurer of the company.

—Rhode Island, Manville. The Manville Company is having plans prepared for a new weave shed, 540 by 240 feet, one story, which they will erect, at a cost of about $100,000. The new building will contain about 1000 looms.

—Rhode Island, Woonsocket. The Social Mfg. Co. will build a large weave shed, 100 by 300 feet, one story.

—South Carolina, Fingerville. An addition has recently been completed for the Fingerville Manufacturing Company, who will install 10,000 spindles in the same during the year.

—*Tennessee, Chattanooga. The Vance Cotton Mill Co. inform us that they are installing additional machinery for purpose of increasing their output. The plant is now being operated night and day on a large contract of 7/1 tube yarn.

—Texas, Sherman. The Sherman Cotton Mill Company contemplates doubling the capacity of the plant by adding 2856 spindles and 72 looms, entailing an expenditure of about $50,000.

—Virginia, Petersburg. The Pocahontas Mills are now building an addition in which they will install 2000 additional spindles, giving them a total of 7000.

Mills Starting Up.

—*Georgia, Savannah. The Savannah Cotton Mill, which has been idle for two years, has been purchased by G. H. Tilton, Tilton, N. H. It is expected to have the plant in operation by April 1st, making yarns only and giving employment to about 100 hands.

—*New Jersey, Deckertown. Operations have been resumed in the Turkish towel plant formerly operated by the Mellor Mfg. Co. The new company, of which E. L. Gifford, is president; Theo. F. Margarum, vice-president; Charles A. Wilson, treasurer; E. I. Sherman, secretary and manager and W. H. Mellor, superintendent, has adopted the name of the Sussex Mills.

—*New York, Lockport. The Niagara Cotton Batting Co., which we previously reported was erecting new buildings, have commenced operations in the new plant on Mulberry St.

—*Pennsylvania, Clifton Heights. The Modoc Yarn Mill, which we previously reported had been purchased by J. B. Cotton, is now being operated in manufacture of 13 to 24 cotton yarns; 3000 spindles. Thomas & Houston, Philadelphia, selling agents for the product.

—*Tennessee, Pinewood. We have been informed by H. H. and T. H. Graham, that they expect to have their plant in operation about February 15th, making 4-4 sheeting, cotton rope and cotton yarns. It has been idle for several years.

Woolen.

New Mills.

—*California, Eureka. Further information in regard to the woolen mill projected here by Mr. A. W. R. Berr, is that $25,000 has already been secured toward the capital stock and as soon as $50,000 worth is received, work will start at once on building the plant.

—California, Petaluma. C. L. Torr, the owner of the California Woolen Mill which was burned a year ago, is trying to organize a company to build a new woolen mill, but nothing definite has been decided.

—Colorado, Denver. W. R. White, formerly of McMinnville, Tenn., contemplates erecting a woolen mill, to be equipped with three sets of cards, and which will give employment to about 175 people.

—Idaho, Caldwell. Walt Lever, who recently made a proposal to build a knitting factory in La Grande, is now starting a woolen mill at Caldwell. Machinery is being installed in a building 50 by 100 feet, two stories and basement, which was formerly used for a warehouse. The machinery came from Denver, probably from the old Hitchcock Mill which has been shut down for several years.

—*Maine, Waterville. F. C. Thayer has been elected president and Thomas Sampson treasurer, of the new Riverview Worsted Mills, which have recently been incorporated, with a capital stock of $50,000. The plant, which will be equipped with 50 looms, for manufacturing fine worsteds for men's wear, will begin production about March, giving employment to 125 hands. There will be a dyehouse.

—Manitoba, Regina. Boaz & Co. have equipped a plant at this place for the manufacture of woolen goods, blankets and felt boots.

—*Massachusetts, Webster. We have been informed by Eben S. Stevens, of Quinebaug, Conn., that the plant which he is to erect here will be in operation about June 1st, making ¾ cotton warp men's wear. As previously stated, that plant will be equipped with 50 looms, and be operated by steam power. Contracts for building have been let to Geo. S. Corbin (foundation) and Frank A. Upham (superstructure).

—*New Jersey, Freehold. We learn from Geyer & Ray that their new rug plant started Feb. 5th, employing 80 hands, with 30 looms. They make two grades of wool rugs, the cheapest and best. They expect to build an addition to the present mill within a short time, giving employment to 50 more hands. They will also put in a plant to do their own dyeing.

—Pennsylvania, Philadelphia. A new concern has recently been started at Howard and Jefferson Streets, known as the Penn Worsted Company, and will make worsted suitings.

—*Pennsylvania, Philadelphia. The contract for rebuilding the large weave shed, 80 by 140 ft. at the Canton Mills, Manayunk, formerly occupied by Caves & Sons, has been let to John W. Fritzinger. This plant has been leased by Lupton & Woods, who will manufacture worsteds.

—*Pennsylvania, Philadelphia. The new building which we reported in last week's issue was to be erected by John P. Holt, contract of which had been let to John W. Fritzinger, at the northwest corner of Baker and Mallory Sts., will be occupied by Messrs. Wolstenholme, who will spin fine French spun worsted yarns.

—Rhode Island, Woonsocket. Two floors of the mill recently purchased by Sayles & Gilleran on South Main Street, have been leased by Joseph Cavedon, of Italy, and Theophile Guerin, of Guerin Spinning Co., Woonsocket, who will install machinery for manufacturing woolen yarns. It is hoped to have the plant in operation within a short time. Details later.

Enlargements and Improvements.

—Connecticut, Rockville. The Fitch Mill of the J. J. Reagan Mfg. Co. is being changed over from a knitting plant into a woolen mill for woven goods.

—*Maine, Dexter. The Morrison Woolen Co., which has recently made additions of machinery to the plant, will now increase the size of the plant, and it is probable that three story addition, giving room for 26 additional looms will be erected.

—*Maine, Fairfield. The Fairfield Worsted Mill, of the American Woolen Co., which has recently undergone changes and improvements for manufacturing woolen goods, will build a one story dye house. It is now, or will be, a 12 set plant with 75 looms.

—*Maine, Newport. Further enlargements and improvements are to be made to the plant of the Newport Woolen Co., which now operates 51 looms. 12 new looms will be installed and other additions made.

—Maine, Wilton. F. J. Goodspeed, proprietor of the Wilton Woolen Mills, contemplates erecting a new plant in another season.

—*Massachusetts, Blackstone. Work has been started on the removal of the machinery on the second floor of the Saranac Mill, to the annex, for the purpose of installing 40 new looms.

—*Massachusetts, Cordaville. The felt department, which we reported in a previous issue was to be added to the Cordaville Woolen Mills, is now to be installed.

—*Massachusetts, East Brookfield. The new building for the Esther Mills, operated by E. Gibson, is nearly completed. When finished, the card room, now in the old mill, will be removed to the new plant and space made vacant will be used for an extracting department.

—Massachusetts, Hampden. Sixteen looms and a 75 h. p. engine, with some finishing machinery, have been recently installed in the woolen mill of John Kenworthy. The new looms will be used for making cotton worsteds, in addition to the manufacture of blankets.

—*Massachusetts, Millbury. Plans are being prepared for the erection of a new dyehouse by the Bowden Felting Works. They are putting in 4 sets of 60 inch cards from N. A. Lombard & Son, largely increasing their capicity.

—Massachusetts, Ware. The George H. Gilbert Mfg. Co. of Ware and Gilbertvile, Mass., is making additions and improvemnts to the machinery in their worsted spinning departments. 14 spinning frames are now being installed.

—*New Hampshire, Enfield. An addition 170x50 feet, three stories high, will be built to the plant of the Baltic Mills, and contract for same has been let.

—*Ohio, Cleveland. The Turner Worsted Company, of Cleveland, Ohio, who have recently increased the capacity of their Ravena plant, will now increase their plant at Cleveland, with a new brick addition, four stories. Four sets of worsted drawing and spinning frames, and 100 looms will be installed.

—Pennsylvania, Philadelphia. James Stafford & Sons, manufacturers of woolens on Kram's Ave., are erecting a two-story brick and iron stock shed, 95 by 18 ft.

—Pennsylvania, Philadelphia. Merz & Bruhn, who operate a woolen and worsted dress goods mill, on Second Street, above Columbia Avenue, will double the capacity of their plant, which is now equipped with 36 looms.

—Pennsylvania, Philadelphia. The PhoenixWorsted Mill, who recently purchased the large mill at Manayunk which they are fitting up with worsted machinery, will consolidate their other mills at 10th Street and Germantown Avenue and Chester, Penn., which will make it one of the largest worsted yarn plants in this state. Wm. Brown, formerly treasurer of the Dingley Manufacturing Company, and Wm. Anderson, of Philadelphia, are the proprietors.

—Pennsylvania, Philadelphia. The American Manufacturing Company, American and Diamond Streets, which now operate 40 looms, weaving cotton and woolen goods, will increase the capacity of its plant to 100 looms.

—Rhode Island, Central Falls. The addition which was built last year to the plant of the Farwell Worsted Mills is being equipped with extra machinery consisting of fifteen new looms, giving employment to fifteen additional hands.

—Rhode Island, Pascoag. Carding and spinning has recently been added to the Stone Worsted Mill, of which Samuel Mellor, is proprietor.

—Rhode Island, Woonsocket. An addition to accommodate about 30 looms will be built to the plant operated by the Dunn Worsted Mills.

—*Texas, Houston Heights. The Augusta Mfg. Co. are putting in four new looms, giving them 14 altogether, for the manufacture of carpets and mattings. They contemplate instaling a small worsted carpet yarn plant later, with probably about two combs.

—Virginia, Laurel Mills. The Rappahannock Woolen Mills Company will increase the capacity of the mill by installing new machinery, for which they are now in the market.

Mills Starting Up.

—Massachusetts, Charlton. Work has been resumed in the satinet mill, formerly operated by James O. Copp. The mill, which has been shut down for some little time, has been run under the management of George Fitzgerald, the superintendent, since the death of Mr. Copps.

—*Massachusetts, Middleboro. The Star Woolen Mill, which has been purchased by the Farwell Worsted Company of Central Falls, is now being operated by that concern. About 25 looms, three sets of cards, three spinning frames and two dressers are already running. Additional looms will be installed in the future.

—*Massachusetts, Pittsfield. Operations have been started in the dyeing and picking departments of the Taconic Mills, James Wilson, proprietor.

—Massachusetts, Spencer. Newton Darling will soon start the Red Mill, which is equipped with three sets of machinery, in the manufacture of yarn. This will give employment to about 50 hands.

—Massachusetts, Uxbridge. The Ironstone Mill, owned by Albert E. Davis, will be put in operation as soon as the stock arrives.

—New Hampshire, Ashuelot. The plant, formerly operated by Edward C. Thayer, has been purchased by James S. Gill & Co., who will renovate the plant and operate it under the old name, i. e., Ashuelot Woolen Mill Corporation. Much of the old machinery will be replaced by new and general improvements made. Thomas West, of Lebanon, will be superintendent and with William T. Gill, of Waltham, Mass., are among the members of the new company.

—*New York, Otto. We have been informed that Charles B. Pierce is to operate the woolen mills here, which have equipment of 3 sets and 22 looms, manufacturing wool dress goods, cloakings and cassimeres, and that Robert P. Grant will act as agent and superintendent. Will sell direct through own agents.

—*Oregon, Union. The Union Woolen Mills will start up March 1st on a line of fine all wool blankets. John P. Wilbur is superintendent.

—*Pennsylvania, Chester. The Mallison Mills, which we reported had been purchased by the South Chester Manufacturing Company, and which will be known as their No. 2 mill, will soon be ready for operation in all its departments. Work has already been started in the spinning and card rooms, and part of the weaving room.

—*Pennsylvania, Clifton Heights. The Caledonia Mills Company, which we reported incorporated at Upper Darby, has been formed for the purpose of operating the Caledonia Mills, previously run by the John Williams Manufacturing Company. William M. Longstreth is president, James T. Stewart manager, and H. Y. Arnold secretary and treasurer of the company, which will have a capital stock of $50,000.

—*Pennsylvania, Doylestown. The new plant of the Doylestown Worsted Co. will soon be ready to begin operation.

—*Rhode Island, Ashaway. The Ashaway Woolen Co.'s mill No. 2 has started up on fine fancy worsteds.

—Rhode Island, Slocumville. The Yawgoo Satinet Mills, B. A. Clark, agent, which have been idle for about a year, will soon resume operations, giving employment to about 40 hands.

—Virginia, Lambert's Point. It is expected that operations will begin early in February in the new blanket mill here.

Knit.

New Mills.

—*Georgia, Griffin. The Griffin Knitting Mills, capital $20,000, is name of new concern which expects to begin operations about April 1st, with 20 machines, making men's and women's underwear. E. H. Spivey, J. J. Mangham and Douglas Boyd are among those interested. Machinery and supplies bought. Building purchased. No dye house.

—Georgia, Washington. Contracts for the machinery for a knitting mill to be built at this place by R. A. Almand, are being placed.

—Louisiana, New Orleans. M. Burke, Room 510 Godchaux Bldg., wants information about knitting machinery for making hose and half hose and underwear. He writes us that he is thinking of going into the business.

—Michigan, Detroit. G. W. Freeman, formerly of Needham, Mass., is now operating a plant at this place, manufacturing surgical elastic hosiery.

—Michigan, Petoskey. Albert Witte & Sons will soon start up a small plant in the manufacture of heavy lumbermen's socks and mittens, for which they have bought Branson, Tuttle and Lamb machines. Mr. Witte has been in the business before, both in Canada and New Hampshire, but retired in '82. He is now going into the business again on his sons' account.

—New York, Little Falls. The Gilbert Knitting Co., recently organized with capital stock of $200,000, and which has absorbed the Astoronga Knitting Co. and the Little Falls Knitting Company, will erect a new knitting mill. Contract for building the new plant, which will be 100 by 100 feet, 4 stories high, has been let to Hallinan Bros.

—*New York, Sherburne. William H. Wild has been elected president, Francis J. Frey, treasurer, and William H. Wild superintendent of the new Canasawacta Knitting Co., which has recently been incorporated with a capital stock of $12,000. The plant, which will be equipped with 34 knitting machines, will be put in operation about the 15th of February, manufacturing cotton underwear.

—New York, Utica. The Fort Schuyler Knitting Co. has been incorporated here with a capital stock of $15,000, and will make ladies' Swiss ribbed cotton, merino, wool and silk underwear. The plant will be started about August with six machines, using electric power. Ezra R. Pugh is president; Chas. P. Clarke, treasurer, and Wm. J. McQuade, superintendent. Wm. Iselin & Co. will sell the goods.

—*North Carolina, Raleigh. The Melrose Knitting Mills, which we previously reported incorporated, have elected Chas. E. Johnson, president and treasurer; J. S. Wayne, vice-president, and John W. Harden, secretary. Most of the capital stock, which is $25,000, has been subscribed, and a committee has been appointed to secure a site.

—North Carolina, Walkertown. J. M. Martin writes us that he is contemplating starting a hosiery mill in a small way, and wishes to obtain information on the subject. He will not embark in the enterprise until he has investigated as to the proper class of goods to make, machinery required, capital employed, etc., and seeks information on these points.

—*Ohio, Bowling Green. John P. Spiker and James S. Black are interested

in the new knitting mill which was started at this place, Feb. 1st, making men's ribbed underwear, union suits, summer and winter weights, in cotton, lisle, wool, worsted and mixtures. The plant consists of 6 machines, etc.

—*Ohio, Mentor. Concerning the knitting mill project mentioned last week in which Root & McBridge Co. are interested, we learn that it will be known as the Mentor Knitting Mills Co., organized under the laws of Ohio, with a capital stock of $50,000 (double liability). Samuel A. Sague is president and general manager; W. C. Spaulding, treasurer; Willis M. Ogden, superintendent; Root & McBridge Co., selling agents. They will manufacture extra high grade underwear. They have bought a building and are remodeling it to make it practically new. They expect to start production in April, running 23 knitting machines and using steam and electric power.

—Pennsylvania, Plymouth. Harry F. Kelly, who has been for ten years in Thomas West's mill, has formed a partnership with James W. Templeton, to manufacture men's seamless half-hose. The new concern will be known as the Shawnee Knitting Mills, and will have a capacity of about 100 dozen per day. The plant will begin operations in March.

—South Carolina, Anderson. The Riverside Mfg. Co. has been organized for purpose of building a knitting factory. The capital stock is $50,000.

—South Carolina, Greenville. A knitting mill is to be established at this place by Theodore T. Bedford, of Pottsville, Pa. Stockings will be manufactured in the plant which will be equipped with 30 machines.

—Tennessee, Bristol. The Bristol Knitting Mills Company has been organized with a capital stock of $100,000. Leo Kaufman, of Nashville, is president, W. B. Davis, of Lenoir, vice president and general manager, and J. C. Byars, of Bristol, secretary. The plant when completed will give employment to about 200 hands.

—*Virginia, Williamsburg. J. B. Spencer has been chosen president of a committee elected to consider the plan of locating a knitting mill at his place. It is proposed to have the mill capitalized at about $100,000, giving employment to about 300 hands. A free site has been offered by a citizen of this place for the new enterprise.

Enlargements and Improvements.

—Minnesota, Rushford. The Rushford Knitting Mills expect to build a small new knitting plant this summer, and will be in the market for an 8 to 12 h. p. steam engine, and 10 to 12 h. p. boiler and other power apparatus.

—*New Hampshire, Laconia. The knitting machinery in the Granite mill of G. H. Tilton, Tilton, N. H., is now being removed to this place, where Mr Tilton has recently made enlargements to his mill. The finishing department will be retained at Tilton.

—New York, Elmira. An addition 50x200 feet is being built to the Queen City Knitting Mills. Price & Personius have contracts for same.

—North Carolina, Weldon. It is reported that the Weldon Cotton Manufacturing Co. will erect a spinning mill for the purpose of supplying yarns for their knitting mill.

—Ohio, Cleveland. H. Friedman & Co. report that they are to add a dye house to their knit goods mill, and expect to have it ready for operation about the 1st of May. They will dye worsted yarn in skeins.

—*Pennsylvania, Bloomsburg. The knitting mill of J & S. Gould, located on Birch Street, So. Bethlehem, is to be removed to this place, where the plant will be combined with the portion of the mill that was removed to Philadelphia, some time previously. New machines will be installed, and it is expected to have the whole mill in operation in a short time.

—Pennsylvania, Schuylkill Haven. The S. Thomas Knitting Mills, manufacturers of knit underwear, expect shortly to dye their own goods in the piece.

Mills Starting Up.

—New York, Utica. The A. V. Lynch Scotch Cap Factory, which has been closed several years, will be removed to 15 Charlotte St., where it will be put in operation.

PERSONAL RECORD.

Cotton.

—James Alward, until recently secondhand in the Stafford Mill, Fall River, has accepted the position of overseer of weaving at the Shove Mills, Fall River, Mass.

—H. H. Boyd has recently returned from Albemarle, N. C., where he has been superintendent of a cotton mill, to accept a similar position at the Howland Mills, New Bedford, Mass.

—John Brennan, who has resigned as overseer of card room No. 2, Howland Mills, New Bedford, Mass., after seven years of service, was recently presented by the employees under him with a diamond ring and a gold watch chain.

—William H. Brocklehurst, for the past three years overseer of one of the departments of the Corr Mfg. Co., Taunton, Mass., has resigned. George A. Brocklehurst, formerly secondhand under him, has been appointed as his successor.

—James E. Briggs, overseer of weaving at the Eagle Mills, Eagleville, Conn., has severed his connection with that company to accept a similar position at the new Spalding Cotton Mills, Griffin, Ga.

—J. D. Boseman, superintendent of the Albion Cotton Mills, Mt. Holly, N. C., and the Stanley Creek (N. C.) Cotton Mills, has resigned his position and accepted the superintendency of the Quinn Mfg. Co.'s plant at Petersburg, Va.

—Andrew Blanding is now overseer of weaving in the Kirk Mills, Central Village, Conn.

—Medrick Bourgett resigned recently as overseer of spinning and slashing in the Bourne Mills, Fall River, Mass.

—Joseph H. Bullock of Northbridge, Mass., has accepted the position of overseer of weaving at Eagleville, Conn., succeeding Mr. Briggs, who has gone South to a similar position.

—W. C. Ball, overseer of spinning in the Nourse Mill of the Social Mfg. Co., Woonsocket, R. I., has resigned on account of ill health.

—P. B. Becker is the new overseer of spinning at the Lane Mills, New Orleans, La.

—Lewis Carter, late superintendent of the Paragon No. 2 mill, Cedartown, Ga., has returned to his old post as superintendent for the Barnesville Mfg. Co., Barnesville, Ga. J. H. Roberts, superintendent of the No. 1 mill of the Paragon Co., has also resigned and is now at Quitman, Ga., and J. H. Hines has been appointed general manager and superintendent of both mills, succeeding both Messrs. Carter and Roberts. Mr. Carter's many Northern friends will be glad to learn of his continued success in the South.

—T. L. Clark has resigned as overseer of carding and spinning at the Galveston Cotton Mill, Galveston, Texas, to accept a position in Birmingham, Ala.

—A. G. Docket, overseer of spinning and spooling in the Utica Steam Cotton Mills, Utica, N. Y., has resigned. The employees presented him with a diamond stud. Mr. Docket has accepted a position with the Berkshire Cotton Mfg. Co., at North Adams, Mass.

—Charles H. Dorsey, late overseer of carding at Roanoke Rapids, N. C., is now in a similar position at the mill of W. J. Dickey & Sons, Oella, Md.

—C. P. Emory is now overseer of carding as well as of spinning at the Lynchburg Cotton Mill Co., Lynchburg, Va., having recently succeeded W. E. Bacon as overseer of carding.

—Edward Farrell, formely with the Efird Mfg. Co., Albemarle, N. C., has accepted the position of overseer of carding at the Slade Mills, Fall River, Mass., succeeding James C. Healey, who resigned a short time ago.

—Arthur H. Gulliver has been appointed agent and superintendent of the Boston Mfg. Co.'s mill at Waltham, Mass., to succeed Charles L. Bailey, resigned. Mr. Gulliver has had charge of the Ashton Mills at Ashton, R. I., for nine years.

—W. Jenkins was recently appointed overseer of the carding department at the Warren Mill, Warrensville, S. C.

—W. T. Jones, recently resigned as overseer of spinning at the Paragon Mills, Cedartown, Ga., in order to continue relations with his old superintendent, Lewis Carter, who is now at the Barnesville Mfg. Co., Barnesville, Ga.

—Ernest Koella has resigned as overseer of carding at the Fulton Bag & Cotton Mill, Atlanta, Ga., to accept the position of superintendent of the Paragon Cotton Mills, Cedartown, Ga.

—James Keely, for 14 years overseer of weaving at the Seaconnet Mills, Fall River, Mass., resigned recently.

—Edwin H. Knowles of Taunton, Mass., has gone South to Columbus, Ga., to accept the position of finisher with the Eagle & Phenix Mills.

—Charles Kee, night overseer of spinning with the Alpha Cotton Mills, Charlotte, N. C., has resigned to accept the position of overseer of spinning with the Quinn Mfg. Co., Petersburg, Va.

—E. H. Lovelace, formerly at the Abbeville Cotton Mills, Abbeville, S. C., is now overseer of weaving, warping, slashing and the cloth room at the Rushton Cotton Mills, Griffin, Ga.

—J. A. Lyons has been appointed boss weaver at the new Orr Cotton Mill at Anderson, S. C.

—W. E. Malloy is now superintendent of the Atlanta & Gulf Mills, Quitman, Ga. He resigned as overseer of carding at the Cedartown, Ga., Paragon Mills, and assumed his new duties February 1st.

—W. H. Norris, superintendent of the Harden Mfg. Co., Harden, N. C., has resigned to accept a similar position with the W. J. Hooper Mfg. Co., Mountain Island, N. C., succeeding D. B. Rodman.

—Henry Patnode of Versailles, Conn., has accepted the position of overseer of spinning, spooling and warping for the Roger Williams Cotton Mills, Arcadia, R. I.

—Isaac F. Prosser has resigned his position as overseer of weaving at the Clinton Mill, Woonsocket, R. I., to act in a similar capacity in the mills of the Boston Duck Co., Bondsville, Mass.

—John Quinlan, for the past three years overseer of the mule and spinning departments of the Union Mills, Moosup, Conn., has resigned and gone to the Warwick Mills in Centreville, R. I.

—George E. Spofford, superintendent of B. B. & R. Knight's mill at Readville, Mass., has succeeded E. A. Mongeon as superintendent of the Blackstone Cotton Mill, Blackstone, Mass.

—P. D. Savage, overseer of spinning of the No. 2 mill of the Odell Mfg. Co., Concord, N. C., has resigned and taken a similar position with the Alpha Mill, Charlotte, N. C.

—E. H. Shanklin, overseer of the cloth room at the Piedmont (S. C.) Mfg. Co., has resigned.

—Charles Sweatman has accepted the position of superintendent of the Triton Cotton Mills, New Castle, Del.

—C. S. Smart, late night boss carder at the Cannon Mill No. 1, Concord, N. C., has succeeded Frank Hornbuckle as day boss carder at the mill.

—I. L. Sargent, recently overseer of weaving in the Barker Mill, Auburn, Me.,

is now with the new Androscoggin Mill, Lewiston, Me.

—T. B. Stevenson, formerly overseer of the card room of the Merrimack Mfg. Co., Lowell, Mass., is now superintendent of B. B. & R. Knight's mill at Readville, Mass.

—Gideon S. Stevens, secondhand in the weaving department of the Atlantic Cotton Mill, Lawrence, Mass., has resigned, after 30 years of service with the company.

—Edward Terryberry is now superintendent of mills Nos. 1 and 2 of D. Trainor & Sons Mfg. Co., Trainor, Pa.

—James M. Taylor, head designer for the Lorraine Mfg. Co., Pawtucket, R. I., has severed his connection with the concern to go into manufacturing business on his own account.

—James W. Walker has resigned his position with the Walker & Williams Mfg. Co., Cohoes, N. Y., to become superintendent of the Walker & Harp Mfg. Co., who will engage in the manufacture of cotton bats in the Continental Knitting Mill Building, Cohoes.

—G. F. Ware of the Caroleen (N. C.) Cotton Mills has resigned and accepted the position of overseer of spinning with the M. Levi Cotton Mill at Rutherfordton, N. C.

—James J. Ward, who was appointed superintendent of the Warren Mill, Warrensville, S. C., to succeed James R. Pearce, has assumed his new duties.

Woolen.

—Martin Burns, overseer in the finishing department at Simson & Kirkaldy's mill, Woonsocket, R. I., has recently been succeeded by John Cullen.

—John W. Bentley, for 10 years in the employ of the Woonsocket Worsted Mills, Woonsocket, R. I., and for eight years overseer of the drawing department of that concern, has resigned to accpet a position as overseer of drawing for the Lymansville Co. at Lymansville, near Providence, R. I.

—E. Bond, formerly of Methuen, Mass., is now boss finisher in the Allen Woolen Mills at Hanover, Conn., succeeding W. Robertson.

—J. Babcock of Potter Hill, R. I., is now cloth percher in the weave room of the American Woolen Co., Harrisville, R. I.

—C. A. Cobbett, Laconia, N. H., is now at the Endrick Woolen Co., Great Barrington, Mass., as carder.

—Samuel Driver of Pawtucket, R. I., has taken a position as general manager of the New Albany Woolen & Cotton Fibre Co., New Albany, Ind., succeeding Arthur Fieldhouse. This concern manufactures woolen shoddies.

—John Eastwood, late of Winooski, Vt., has accepted the position of boss finisher at Monson, Mass., with S. F. Cushman & Sons, succeeding William Nason, who had been at the mills in that capacity for the past 13 years.

—Josiah Evans, boss weaver in the Vassalboro Woolen Mill, No. Vassalboro, Me., has resigned to accept a position in a mill in Cleveland, O.

—Frank Fiske has succeeded John T. Fiske, Jr., as agent of the Sheffield Worsted Mills, Pascoag, R. I.

—Charles E. Tallis, formerly boss carder at the Devonshire Mills, Goff's Falls, N. H., has secured a position as boss carder in Dayville, Conn.

—Jacob Geb, who for many years has had charge of the carding department of the Ray Woolen Mill, Franklin, Mass., now controlled by the American Woolen Co., has taken charge of both the carding and spinning departments.

—Thomas Heines, an overseer of carding for William Wood & Co., Philadelphia, Pa., recently resigned to accept a similar position with the South Chester Mfg. Co., Chester, Pa.

—John Kavanaugh, secondhand in the Rock Mfg. Co.'s mill, Rockville, Conn., has accepted a position with the Hope Valley Woolen Co., Hope Valley, R. I.

—George Leach has been engaged as superintendent of the Milner Mills, Moosup, Conn. He was formerly employed at the Manton Mills, Manton, and several other Rhode Island mills.

—John Mallison, Philadelphia, Pa., has succeeded Joseph Ogden as overseer of spinning on night work for the Bridgeton Woolen Co., Bridgeton, N. J.

—William Moffat, formerly of Rochdale, Mass., has been appointed boss carder at the Massasoit Woolen Mills, Monson, Mass.

—Rudolph Miller, of Philadelphia, Pa., is now at St. Hyacinthe, P. Q., where he has recently accepted the position of designer with the Canadian Woolen Mills Co.

—Chas. N. Mullican, late of Atlanta, Ga., has accepted the position of manager of the Rockbourne Mills of the Thomas Kent Mfg. Co., Clifton Heights, Pa.

—George E. Newall has resigned as designer for the French River Textile Co., Mechanicsville, Conn., and taken a position as designer in Manton, R. I.

—Patrick O'Brien, an overseer in the Faulkner Mills, Lowell, Mass., resigned recently, and was presented with a couch and pipe by the employees under his charge.

—Joseph Ogden, late overseer of spinning on night work for the Bridgeton (N. J.) Woolen Co., has recently accepted a position in a similar capacity on day work with Henry Grant & Son, Philadelphia, Pa.

—Joseph Riley is now boss spinner at the Gardiner Shoddy Mill, Gardiner, Me.

—A. L. Sprague has succeeded C. A. Root as designer at the Hecla Mill, Uxbridge, Mass.

—Isaac K. Stead, overseer of carding for William Emsley & Bro., yarn manufacturers of Philadelphia, Pa., resigned last month.

—Walter Scott, Harrisville, R. I., is now designer at the Riverside Woolen Co., Pittsfield, Me.

—Arthur Threeappleton is now boss carder and spinner with the Monongahela Textile Co., Morgantown, W. Va.

—Fred Teal, formerly overseer of weaving in the M. Collins Woolen Mill, Collinsville, Mass., of the American Woolen Co., is now in a similar capacity in that company's mill at North Vassalboro, Me.

—William A. West, for the past 13 years engineer at the Bigelow Carpet Co.'s works at Clinton, Mass., has accepted the position of engineer at the Grant Yarn Mill, Fitchburg, Mass.

—R. G. West recently tendered his resignation to Josiah Perry, Webster, Mass., in order to accept the position of assistant superintendent for Agent A. W. Sholes of the New London Steam Woolen Mills, New London, Conn.

—James Williams, late overseer of carding with John P. Chemberlin, Seneca Falls, N. Y., is now employed at the mills of the Crosby Mfg. Co., East Glastonbury, Conn., in a similar capacity.

—Simeon Wrigley, secondhand in the spinning room at the Marland Mills, Andover, Mass., has accepted position of foreman in the spinning room at the North Andover Mills recently leased by M. T. Stevens & Sons.

—Walter D. West, who has been head bookkeeper in the Riverside Woolen Mills, Lebanon, N. H., is to be assistant superintendent at the Thayer Mills, Ashuelot, N. H., having immediate charge of the weaving department.

Knit.

—Charles Dickey, of Cohoes, N. Y., has been obliged to resign his position with the Queen City Knitting Mills, Elmira, N. Y., on account of the mill stopping night work.

—Norris Fountain is now overseer of carding for the Waterford Knitting Co., Waterford, N. Y.

—Gilbert Hallis, formerly of the Lebanon Mills, Pawtucket, R. I., has recently taken charge of the knitting and spooling at the Samuel Fitch Mfg. Co.'s mill, Thornton, R. I.

—Herman Heaseler has recently secured the position of dyer with the Des Moines Hosiery Mills, Des Moines, Iowa.

—E. A. Herrick, superintendent of Mill No. 3 of the Utica (N. Y.) Knitting Company, has resigned. The mill was formerly the Oriskany Falls Knitting Co.'s plant.

—Harold Lamb, of the firm of Lamb & Hollingsworth, Augusta, Ga., has given up his present business, to accept the presidency of the Union Mfg. Co.'s hosiery mill at Union Point, Ga.

—George J. Manderfield, who for some years was traveling representative of H. Brinton & Co., Philadelphia, Pa., has severed his connection with that concern and accepted a position with Mr. Lewis E. Taubel, proprietor of the Star Knitting Mills, Norristown, Pa.

—William Monroe, for some time foreman of the Cooper Knitting Mill, Bennington, Vt., has resigned and removed to Cohoes, N. Y. William Long is his successor at the Cooper Mills.

—John Stickels, Philmont, N. Y., has accepted a position with Foster Black, Elizabeth Knitting Mills, Berkeley, Va., as boss spinner.

—John Temple, Bennington, Vt., has accepted the position of carder and spinner with the Mankato Mills Co., Mankato, Minn.

—John Walton, late of Wilkesbarre, Pa., has gone to Lenoir City, Tenn., to take charge of knitting in the Dixie Mills.

Deaths.

—Hon. J. G. Ray of Franklin, Mass., died February 24th of heart failure. He was 69 years of age, and the last of the four famous Rays at this place. Mr. Ray, with his brother, Francis B. Ray, in 1850 started the first rag picker operated in the section of the state in which they lived. From this the first shoddy mill in New England was started, under the firm of Ray Bros., at Unionville. In 1860 this firm was dissolved, Francis B. Ray retiring. The business was then carried on by J. P. & J. G. Ray, who also purchased the Bartlett mill at Woonsocket, R. I., and engaged in the manufacture of cotton sheetings. In 1865 they purchased a woolen mill in North Bellingham, for the manufacture of satinets. In 1870 they built a mill at Franklin Centre and in 1877 another mill was erected for the manufacture of fancy cassimeres. At the time of his death he was vice-president of the American Woolen Co., president of the American Felt Co., and owner of the Franklin water works. He was also very largely interested in copper mines in the West, and was a large stockholder in the Woonsocket Electric & Power Co., Woonsocket Street Ry. and Milford, Attleboro & Woonsocket Street Ry. A wife and two children survive him.

—The death of Joseph H. Kendrick, of the American Supply Co., which occurred at his home, 32 Stewart St., Providence, R. I., February 20th, was universally regretted. He had not been well for the past three or four months, but was believed to be recovering his former health. On the Saturday night preceding his death, he was suddenly attacked with acute Bright's disease, becoming unconscious soon after and remaining so until the end. Mr. Kendrick was born in Winchester, N. H., March 19, 1831. When 16 years old, he went to work for his elder brother John, who had started in the loom harness business two years previous, in 1846, in Woonsocket, R. I. Up to that time each mill had made its own harness. The manufacture of reeds was later taken up at the Woonsocket shop, and in 1848 a branch shop was opened at Worcester, Mass., and Joseph H. Kendrick placed in charge. The firm name was changed in 1873 to the Kendrick Loom Harness Co., under which the shops in Providence and Fall River, the latter established in 1866, were merged. In 1883 the present American Supply Co. was formed by the consolidation of the Kendrick Loom Harness Co. and Myron

Fish & Co., of Providence, with Mr. Kendrick as general agent, which position he occupied at the time of his death. Mr. Kendrick enlisted in the army during the Civil War and served throughout. In the city council he had long and honorably represented the 4th ward in the lower branch of which he was at the time of his death, as in 1898, the president. He was also interested in musical affairs, and belonged to many societies. In mill circles he was widely known and universally esteemed.

—Jacob Booth of Southbridge, Mass., president of the Southbridge Printing Co., died in Jacksonville, Fla., February 10. He had gone South for his health. Mr. Booth was a well-known man in calico printing and print cloth circles throughout New England, and was a director of the Southbridge National Bank, a member of the board of investment of the Southbridge Savings Bank, and a director of the Southbridge Optical Co., Southbridge Gas & Electric Co., Southbridge & Sturbridge St. Railway Co. and Southbridge Water Supply Co. He was born in Woonsocket, Sept. 8, 1836.

—James Dugdale, a retired woolen manufacturer of Lowell, Mass., died at his home, 202 Lawrence St., February 23d, aged 77 years.

—William H. Magee, for 18 years superintendent of the Berkeley Cotton Mills, Berkeley, R. I., and one of the best known cotton mill superintendents in New England, died at his home on Mendon Road, Woonsocket, February 8, in his sixtieth year. He had worked as overseer and superintendent in Woonsocket, Uxbridge and other towns and cities in this section of the United States, and was recognized as a very able man in his business. He had a wide circle of acquaintances, and his death was universally mourned.

—James Holmes Thomas died at his home in North Grafton, Mass., February 5. He was born in Prescott, Me., February 8, 1827. Mr. Thomas was for many years superintendent of the Grafton Mfg. Co.'s mill, but owing to ill health was obliged to retire, and since has been quite prominently connected with North Grafton's business history in different ways, his residence in which town covering a period of nearly 35 years.

—James McDonald, superintendent of the Napa Woolen Mill at Napa, Cal., accidentally shot himself while hunting, Feb. 6, and died soon afterwards. Mr. McDonald was a native of Rhode Island, and 30 years of age. About a year ago he went from Albany, O., to Napa, to accept the superintendency of the mill there, which had been most prosperous during his management, and the employees under him mourned his death as a personal loss.

—James O. Pickerd, superintendent of the Randleman Mfg. Co., Randleman, N. C., died suddenly at his home last month.

—John Sholes, manager of the Stearns Silk Mills, Elmira, N. Y., died suddenly Friday afternoon, February 2. He was 75 years of age.

—John Dunn Wood, a retired merchant of New York, died February 12th from pneumonia. He was engaged in business in New York City in the East India trade, and later as junior member of the firm of E. S. Higgins & Co., manufacturers of carpets. He retired from business six years ago.

—William H. Smith of the firm of Smith & Cooley, manufacturers of woolens and shoddies in Stafford Springs, Conn., died Feb. 17th from Bright's disease. Age 52 years.

—John Shadle, for many years a member of the firm of J. G. Leinbach & Co., Reading, Pa., proprietors of the Reading Woolen Mill at that place, died very suddenly at his home February 19th, aged 72 years. He acted as superintendent of the mill.

—George W. Fisher, one of the largest and most widely known manufacturers in Worcester Co., died at his home in Grafton, Feb. 7, after an illness of some three week's duration. Mr. Fisher was born in Fisherville, in Grafton, Mass., Nov. 18, 1843, received his early education in Grafton public schools and later went to an academy in Worcester. He graduated from Yale with the class of 1868. At the time of his death he was agent of the Fisher Mfg. Co., vice-president and director of the Grafton National Bank and a member of the Finance Committee of Grafton Savings Bank, a member of the Home Market Club of Boston, and was identified with all measures for public improvement in the town in which he lived. He was especially interested in public education, and was in hearty sympathy with the improvements now in progress in the schools of Grafton.

—Charles Coulter, of the firm of Coulter & Lowry, proprietors of the Excelsior Finishing Works, Philadelphia, Pa., died suddenly last month of heart disease. He was born in Philadelphia in 1833, and was in the finishing business all his life. For the past 22 years he had been associated with John C. Lowry at the present place of business.

—O. H. Durrell, member of the governor's council and head of the wholesale dry goods house of Brown, Durrell & Co., Boston, died at his home on Dana St., Cambridge, Mass., at 11 P. M., January 30th. Mr. Durrell was born in Cambridge about 50 years ago. At the time of the big Boston fire, he held a position as clerk in the office of Brown, Dutton & Co. After the fire the old firm dissolved and a new one reorganized with J. A. Brown as the senior partner and T. B. Fitzpatrick and Mr. Durrell, who had been fellow clerks in the old store, making up the firm. They started in in an old building on Chauncy St., and from that time on the business rapidly increased, until it has become one of the largest wholesale dry goods houses in New England. Mr. Durrell was also identified with other business interests. He was vice-president of the Cambridgeport Savings Bank, director of the Shoe & Leather National Bank, director and member of the finance committee of the John Hancock Life Insurance Company, a trustee and member of the finance committee of Boston and Brown Universities and a state trustee and member of the finance committee of the Massachusetts Homoeopathic Hospital.

—Edwin H. Bugbee, one of the most prominent citizens in Putnam, Conn., died recently, as the result of a paralytic shock received several days before. His first important enterprise was the leasing of the North Providence Mfg. Co.'s mill, with Henry Weaver, of which he had

been bookkeeper. The undertaking was successful, but the plant had to be given up on the expiration of the lease, as the mill had been sold. In 1849 he entered the employ of the Williamsville Mfg. Co., Killingly, Conn., where he remained until 1879. From 1857 to 1879 Mr. Bugbee represented the town eight times as representative and three times as state senator, besides holding many other offices.

—Frederick D. Northrop, overseer in the spinning and spooling departments of the Lancaster Mills, Clinton, Mass., died at the hospital in that city February 27th. He came to Clinton from Suncook, N. H., twenty years ago.

—Joshua Perkins, a director in the Samuel Fitch & Sons Co. of Thornton, R. I., manufacturers of eiderdowns, plushes and satinets, died in Rockville, Conn., where he had been to attend a meeting of stockholders, January 31st. Mr. Perkins' home was at Burrillville, where he leaves a widow and one son.

—William J. Simmons, an old and highly respected citizen of Troy, N. Y., died February 12th at his home on Oakwood Ave. He managed a paper mill in Fort Edward, later was in the lumber business and in 1875 engaged with William C. Tompkins in the operation of the Brookside Hosiery Mill. He retired from business in 1883.

—Oscar Henning, an overseer in the Germania Mills, Holyoke, Mass., fell dov. an elevator shaft, February 26th, strik g on his head, and was instantly killed.

—John Bury, for more than twenty years overseer of spooling with the American Linen Co., Fall River, Mass., until a few years ago, died in that city recently, aged 81 years.

—James B. Finney, superintendent of the yard of the Lancaster Mills, Clinton, Mass., died suddenly at his home February 8th, as the result of a paralytic shock. He entered the employ of the corporation when a mere lad, and reached his present position through steady promotion. He had been in the employ of the company for thirty years.

—John W. Lyon, foreman for many years at the Crompton & Knowles Loom Works, Worcester, Mass., died at his home on the morning of February 12th, from pneumonia. He was born in Providence 47 years ago, and had been a machinist all his life. A widow and two daughters survive him.

—J. E. Wallace, a well-known resident of Tallassee, Ala., and for 25 years overseer of the spinning department at the Tallassee Falls Mfg. Co., died recently. His son, T. B. Wallace has been appointed to succeed him.

—Louis Geiger, night watchman at the Empire Print Works at Soho, near Bloomfield, N. J., was drowned last month. The dam at the works gave way, and his body was carried into the Passaic River.

—Loren D. Lyford, an overseer employed by the Exeter Mfg. Co., Exeter, N. H., was drowned near the dam of the corporation, February 14th. He was superintending the removal of ice which had been brought down by the flood to the opening of the penstock, and by a misstep fell into the water. Mr. Lyford was 38 years of age and leaves a family of three small children.

—Thomas Manning, an employee at the Brainerd & Armstrong mill, New London, Conn., died recently. Aged 70 years.

—Mason A. Harrington, a well-known citizen of Fitchburg, Mass., died recently. For many years he was employed as boss weaver in the old Sherwin Mill.

Patents.

(Concluded from page 411.)

Looms, Warp Stop Motion for. 643,402. Randolph Crompton, Worcester, Mass., assignor to the Crompton & Knowles Loom Works, same place.

Looms, Warp Stop Motion for. 643,299 and 643,300. Chas. A. Littlefield, Lowell, Mass., assignor to the Draper Company, Portland, Me., and Hopedale, Mass.

Mercerizing, Apparatus for. 643,781. Raoul Subrenat, St. Julien, France.

Mercerizing, Apparatus for. 642,899. Jules Dolder, Grovenbroich, Germany.

Napping Machine. 643,247 and 643,248. David Gessner, Worcester, Mass.

Quilling Machine. 642,543. Dwight Ashley, Paterson, N. J., assignor to the Sipp Electric and Machine Co., same place.

Quilting Frame. 642,786. Benjamin M. Daves, Mimosa, Tenn.

Ring Spinning Machine. 643,436. Eugene F. Willey and Henry Connacher, Manville, R. I., assignors to the Draper Co., Portland, Me., and Hopedale, Mass.

Spinning and Twisting Machine. 643,302. Wilhelm Neubauer, Bischweiler, Germany.

Spinning and Twisting Machine Spindle. 643,342 and 643,343. Henry F. Woodmancy, Whitinsville, Mass.; Cyrus A. Taft, executor of said Woodmancy, deceased.

Spinning Frames, Roving Stop-Motion for. 643,971. James H. Northrop, Tustin, Cal., assignor to the Draper Company, Portland, Me., and Hopedale, Mass.

Spinning Machines, Top Roll for. 642,868. John R. Milson, Bristol, R. I.

Tapestry or Embroidery, Producing on Paper Imitations of. 643,321. Eugene Courbet, Paris, France.

Textile Fabrics, Clasp for. 642,236. Fannie C. Larimer, Los Angeles, Cal.

Textile Machinery, Roll Clearer for. 643,530. Loren W. Penney, Newton, Mass., assignor to the Saco & Pettee Machine Shops, same place.

Thread Guide, Automatically Locking. 642,095. Daniel A. Dugan, New York City.

Warp or Weft Threads, Apparatus for Scouring or Equalizing. 643,390. Wilhelm G. Andriessen, Crefeld, Germany.

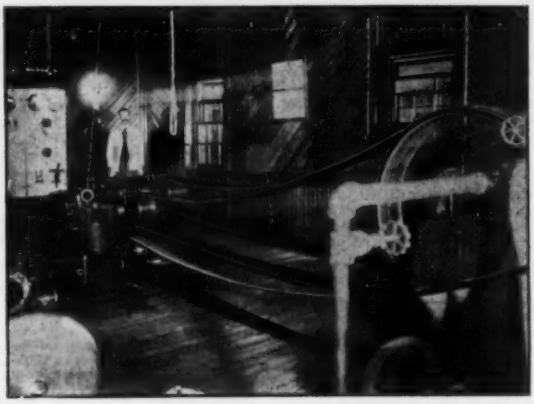
Wool-Combing Machine, Dabbing-Brush Apparatus for. 642,160. Isaac Rushworth, Jamestown, N. Y.

Yarn-Sizing Apparatus, etc., Means for Carrying Off Impure Steam or Fumes Arising From. 642,469. Henry Martin and John H. Martin, Burnley, England.

Jamesburg, N. J., 12-11-'99.
Cling-Surface Mfg. Co

Gentlemen: Of these belts, the rear 12 inch belt, 18 feet centres, has 17 inch slack; middle 8 inch belt, 16 feet centres, has 15 inch slack; front 4 inch belt, 13 feet centres, has 12 inch slack. They run this way every day. Before using Cling-Surface all were very tight. It does all you claim.

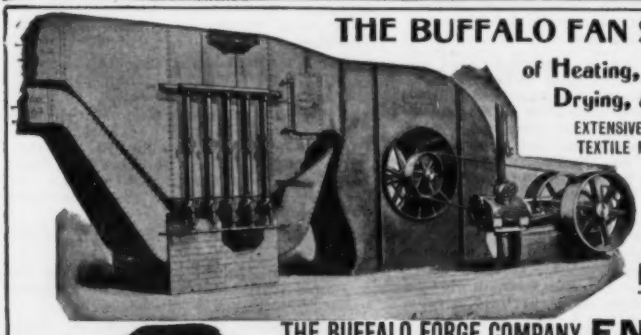
E. C. FROST,
Chief Engineer
State Reform School



UPRIGHT BELTS WILL NOT RUN AS SLACK AS HORIZONITAL BELTS—THEY WOULD DROP AWAY FROM LOWER PULLEY. But the point is this: No belt can slip and run slack, so Cling-Surface has stopped the slipping. The slack comes as a result. Upright belts also stop slipping and will run easy—just fitting the pulley, they won't run off, will transmit at least 15 per cent. more power and remain pliable and in perfect condition. If not you pay us nothing at all. Ask for booklet of slack belts and of other mills.

New England Branch, 170 Summer Street, Boston.
New York Branch, Postal Building, 253 Broadway.
Chicago Branch, 225 Dearborn Street.

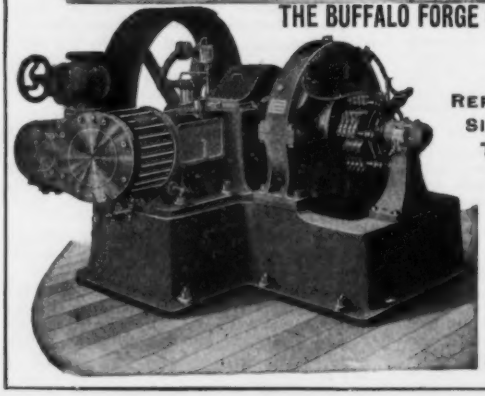
CLING-SURFACE MFG. CO,
199-205 Virginia St., Buffalo, N. Y.



THE BUFFALO FAN SYSTEM
of Heating, Ventilating, Drying, and Cooling.
EXTENSIVELY USED IN TEXTILE MILLS.

The Buffalo Cotton Elevating Fans.

THE BUFFALO FORGE COMPANY ENGINE.



FIRST AWARD AND GOLD MEDAL AT OMAHA, 1898.

REFINEMENT OF REGULATION.
SIMPLICITY OF DESIGN.
THOROUGHNESS OF CONSTRUCTION.
EXCELLENCE OF FINISH.

Catalogue of all on application.

Buffalo Forge Company,
BUFFALO, N. Y., U. S. A.
New York. Cleveland. Chicago.

BUYERS' INDEX.

Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

Alphabetical Index to Advertisements follows this Classified List.

Air Moistening System.
American Moistening Co., 150 Devonshire St., Boston.

Architects and Mill Engineers.
Berlin Iron Bridge Co. The, East Berlin, Ct.
Ferguson, John W., Paterson, N. J.
Tower & Wallace, Broadway and 25th St., New York, N. Y.

Asphalt Roof'ng.
Warren Bros. Co. 143 Federal St., Boston.

Automatic Feeds for Cotton and Wool.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Baling Machine.
Torrance Mfg. Co, 18 Davis St, E. Newark, N. J.

Bandings.
See under Yarns.

Belting.
Alexander Bros., 410 No. 3d St., Phila., Pa.
Boston Belting Co., Boston, Mass.
Hammer, C. H & Co., Philadelphia.
Jeffrey Manufacturing Co., Columbus, Ohio.
Link Belt Machinery Co., Chicago, Ill.
Popham, Henry, & Son, Newark, New Jersey.
See also Mill Supplies.

Belt Dressing.
Alexander Bros, 410 No. 3d St, Phila, Pa.
Cling Surface Co., 168 Virginia St., Buffalo, N. Y.
Stephenson Mfg. Co., Albany, N. Y.

Belt Hooks.
Bristols Co., Waterbury, Ct.

Bindings.
See Tapes and Braids.

Bleaching Materials.
Bosson & Lane, Boston.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Blowers.
American Blower Co., Detroit, Mich.
Buffalo Forge Co., Buffalo, N. Y.
New York Blower Co., New York.
Sturtevant, B. F. Co., Boston, Mass.

Bobbins, Spools, Shuttles, Etc.
Murray, C. O., Nashua, N. H
Parker, Henry Co., Springfield, Vt.
Tebbets, E. L., & Co., Locke's Mill, Me.

Boiler Compounds.
Straus & Co., 59 Broad St., New York.

Boiler Tube Cleaners.
Coggeshall Mfg. Co., 130 1-2 Liberty St., New York.

Boxes, Cloth Boards, Etc.
Pearson, J. T, Kensington, Pa.

Braiding Machinery.
New England Butt Co., Providence, R. I.
Thun & Janssen, Reading, Pa.

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See Tapes, Braids and Edgings.

Brass (Perforated.)
See under Perforated Metal.

Bridges.
The Berlin Iron Bridge Co., East Berlin, Conn.

Brushes.
Felton, S. A. & Son Co., Manchester, N. H.

Brushers.
See Napping Machines.

Buildings (Steel).
The Berlin Iron Bridge Co., East Berlin, Conn

Burr Pickers.
Curtis & Marble Machine Co., Worcester Mass.
Sargent's, C. G., Sons, Graniteville, Mass.

Calico Printers' Machinery and Supplies.
Birch Brothers, Somerville, Mass.
Butterworth, H. W., Sons & Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
New Bedford Copper Co, New Bedford, Mass.
Phillips Co, The Thomas, Providence, R. I.
Rusden Machine Co., Warren, R. I.
See also Dyeing, Bleaching Machinery, etc.

Card Clothing.
Ashworth, Elijah, Fall River, Mass.
Buck Card Clothing Co., Palmer, Mass.
Hammer, C. H. & Co., Philadelphia.
Leigh, Evan A, 35 Mason Building, Boston.

Card Grinding Machinery.
Hardy Machine Co., Biddeford, Me.
Roy, B. S. & Son, Worcester, Mass.

Carders' Tools.
Brown, W. H, Mechanic St, Worcester Mass.

Carpet Machinery.
Altemus, W. W, & Son, 2816 N. 4th S Phila. Pa.
Curtis & Marble Machine Co, Worcester, Ms.
Furbush, M. A, & Son, Machine Co, Phila, Pa.
Granger Foundry & Machine Co., Providence, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Chemicals and Apparatus.
Bullock & Crenshaw, 528 Arch St, Phila, Pa.
Roessler & Hasslacher Chemical Co, 100 William St, New York.

Chemist.
Adriance, John S., 105 East 39th St., New York.

Clutches.
The Eastern Machinery Co., New Haven, Conn.
James Hunter Machine Co., North Adams, Mass.
American Tool & Machine Co., Boston, Mass.

Coal, (Anthracite and Bituminous.)
Whitney & Kemmerer, 143 Liberty St., N.Y

Combs (Wool and Cotton).
Crabb, William, & Co, Newark, N. J.

Commission Merchants (Dry Goods, Knit Goods).
Hayes, O. H., 10 Thomas St., New York.
Hirschman, H. 419 Broome St., New York.

Conveying Machinery and Chains.
Jeffrey Manufacturing Co., Columbus, O.
Link Belt Machines Co., Chicago, Ill.

Copper (Perforated.)
See under Perforated Metal.

Copper Print Rollers.
New Bedford Copper Co, New Bedford Mass.
Phillips Co, The Thomas, Providence, R. I.

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TELEGRAM

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Received at OFFICE IN BARNES HOUSE, Chicago. CANAL AND RANDOLPH STS

91 ChJe D 12 Paid.

Fall River, Mass. July 12th 1899

Warren Mfg. Co.
65 S Canal St.
Chicago.

Send us two more cases Liquid Pulley Cover. Need it on Saturday morning.

American Linen Co. 3:53 PM

WARREN'S

LIQUID PULLEY COVER.

WHAT IS IT? It is a PERFECT Substitute for Leather Lagging.

Don't glue your Belts to your Pulley Surfaces with any Anti-Slip Belt-Dope. *Imagine the result, stop and think*, and then order a trial case of this Liquid Cover of the

WARREN MFG. CO.,

26 Jackson St., - - - - - Chicago.

Harcourt Amory, Treasurer, Boston, Mass

Lancaster Mills. Agent's Office.

Chas. H. Richardson, Agent.

Clinton, Mass Nov. 7th, 1899.

Dictated C.H.R.

The Warren Mfg. Co.,

65 So. Canal St.,

Chicago, Ill.

Gentlemen:-

Please send us 4 cases of Liquid Pulley Cover. The case ordered recently seems to work very well.

Yours truly,

Chas. H. Richardson Agt.

Copper Work for Dyers.
Butterworth, H. W. & Sons Co., Philadelphia.
Burkhard, Thomas, 494 Flushing Ave., Brooklyn, N. Y.
Granger Foundry & Machine Co., Providence, R. I.
Phillips Co, The Thomas, Providence, R. I.

Corrugated Iron Shutters.
The Berlin Iron Bridge Co., East Berlin, Conn.

Cotton (Egyptian).
Stoddard, Haserick, Richards & Co., Boston.

Cotton Elevators.
Buffalo Forge Co., Buffalo, N. Y.
Link Belt Machines Co., Chicago, Ill.

Cotton Machinery.
Altemus, W. W. & Son, 2816 N. 4th St, Phila. Pa.
Ashworth, Elijah, Fall River, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Mass.
Draper Company, Hopedale, Mass.
Easton-Burnham Co., Pawtucket, R. I.
Fairmount Machine Co, 22d and Wood Sts, Philadelphia.
Howard & Bullough American Machine Co, Pawtucket, R. I.
Kilburn, Lincoln & Co, Fall River, Mass.
Leigh, Evan A, 35 Mason Building, Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
McKerrow, H. G & Co., Boston, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Schofield, Geo. L., Philadelphia.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Whitin Machine Wks, Whitinsville, Mass.
Woonsocket Machine & Press Co, Woonsocket, R, I.

Cotton Openers and Lappers.
Howard & Bullough American Machine Co, Pawtucket, R. I.

Cutters for Knit Fabrics.
Kennedy, Thos. (Cutters, etc.,) Cohoes, N. Y

Decoration Wash for Interiors.
Moore, Benj. & Co., Brooklyn, N. Y.

Designers.
Freund, Eugene F, 140 Maiden Lane, New York.

Dextrine.
Stein, Hirsh & Co, 165 Duane St., New York.

Dryers.
Birch Brothers, Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Kenyon, D. R. & Son., Raritan, N. J.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co, Philadelphia, Pa.
Phillips Co, The Thomas, Providence, R. I.
Rusden Machine Co., Warren, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Dusters.
See Wool and Waste Dusters.

Dyers, Bleachers and Finishers.
American Yarn Printing Works, 134-136 North 22d St., Philadelphia.
Brophy's, T, Sons, Jasper St, Philadelphia.
Capstick, John & Sons, Montville, N. J.
Cohoes Dye Works, Cohoes, N. Y.
Cranston Worsted Mills (yarns), Bristol R I.
Davidson & Brooke, 2560 No. 3d St., Philadelphia.
Duncan & Baillie, Cohoes, N. Y.
Firth & Foster Co, Kensington, Pa.
Greenwood, R, & Bault, Frankford, Pa.
Home Bleach & Dye Works, Pawtucket and Valley Falls, R. I.
Littlewood, G. J., & Sons, Manayunk, Pa.
Lorimers, The Wm. H. & Sons Co., Phila.
Molt Bros., Millbury, Mass. (Indigo Blue.)
New England Thread Co, Pawtucket, R. I.
Pawtucket Dyeing & Bleaching Co, Pawtucket, R. I.
Philadelphia Linen Finishing Co., Frankfort, Philadelphia.
Rowland, Samuel, Schuylkill Haven, Pa.
Warren, W, Thread Works, Westfield, Mass.

Dyeing, Drying, Bleaching and Finishing Machinery.
Birch Bros., Somerville, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Butterworth, H. W, & Sons Co Phila Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Fairmount Machine Co, 22 and Wood Sts, Philadelphia.
Granger Foundry & Machine Co, Providence, R. I.
Hopkins, Machine Works, Bridgeton, R. I.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Kenyon, D. R. & Son, Raritan, N. J.
Knapp, C. H., Paterson, N. J.
Lincoln, The, Co, 54 Arch St, Hartford, Ct.
Parks & Woolson Machine Co., Springfield, Vt.
Peel, Samuel H. Germantown, Philadelphia Pa.
Phenix Iron Foundry, Providence, R. I.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia, Pa.
Philadelphia Textile Machinery Co, Hancock and Somerset Sts, Philadelphia, Pa.
Phillips, The Thomas Co, 91-95 South Main St, Providence, R. I.
Rusden Machine Co., Warren, R. I.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass. (Drying.)
Weihe, H. C. Philadelphia.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Dye House Cans.
Hill, James Mfg. Co., Providence, R. I.

Dye Sticks.
Bailey, Frank, Cedar Brook, New Jersey.
Haedrich, E. M, Philadelphia, Pa.

Dyestuffs and Chemicals.
American Aniline Co., 163 No. Front St., Philadelphia.
Anchor Color Mfg. Co, 464 Cherry St, New York.
Atteaux, F. E. & Co., 174-176 Purchase St Boston.
Berlin Aniline Works, 72 Front St., N. Y.
Bischoff, & Co, 87 Park Place, N. Y.
Bosson & Lane, 36 Central Wharf, Boston.
Corey, S. J, 273 Congress St, Boston
Dillon & Co, 20 Cedar St, New York.
Farbenfabriken of Elberfeld Co, 40 Stone St, N. Y.
Geisenheimer & Co, 189 Front St, New York.
Innis & Co, 3 Cedar St, New York.
Jaeck Bros., The, Co., 62-68 No. 11th St, Brooklyn, N. Y.
Janney, O. S, & Co, Phila. and Boston.
Johnson, Chas. A, & Co, 22 Dey St, N. Y
Johnson, Wm. G, & Co, Uncasville, Conn.
Keller, John J, & Co, 104-106 Murray St, N. Y.
Klipstein, A, & Co, 122 Pearl St, N. Y.
Koechl. Victor, & Co, 122 Hudson St. N. Y.
Kuttroff, Pickhardt & Co., New York.
Matheson, W. J, & Co, 182-184 Front St, N. Y.
Merrimac Chemical Co, Boston, Mass.
Molt Bros., Millbury, Mass. (Indigo Blue.)
N. Y. & Boston Dyewood Co, 55 Beekman St, New York.
Oakes Mfg. Co, 93 Pearl St, N. Y.
Palmetto Co., The, 942-44 Drexel Building, Philadelphia.
Richmond & Foley, 235 N. Front St., Philadelphia.
Roessler & Hasslacher Chemical Co, 100 William St., New York.
Schoellkopf, Hartford & Hanna Co., Philadelphia.
Sharpless Dye Wood Ext. Co, The Bourse, Phila, Pa.
Stamford Mfg. Co, 133-137 Front St., N. Y.

Stone & Ware Co, The, 157 Maiden Lane, N. Y.
Sykes & Street, 85 Water St, N. Y.
Thayer, Ed. M., 106 Broad St., Boston, Mass.

Dynamos.
Sturtevant, Co., B. F. Boston.

Edgings.
See Tapes, Braids and Edgings.

Elastic Web Calendering Machines.
Knapp, C. H., Paterson, N. J.

Electrotyping and Printing.
Whitcomb, H. C, & Co, Boston.

Elevators.
Cohoes Foundry & Machine Co, Cohoes, N.Y
Eastern Machinery Co, The, New Haven, Conn.
Jeffrey Manufacturing Co., Columbus, O.
Howard, Geo. C., 1783 Barker St., Phila., Pa.

Electrical Construction.
Philadelphia Electric Construction Co., Philadelphia.

Electric Fans.
Buffalo Forge Co., Buffalo N. Y.
Sturtevant Co., B. F., Boston.

Electric Motors.
Sturtevant Co., B. F., Boston.

Engineers, Mechanical.
Berlin Iron Bridge Co., The, East Berlin, Conn.
Ferguson, John W, Paterson, N. J.

Fans—Exhaust and Ventilating.
See Ventilating Apparatus.

Feed Water Heaters.
Kelley, Benj. F. & son, 91 Liberty S New York.
Pendleton, Walter & Co., New York.

Feed Water Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Phœnix Iron Foundry, Providence, R. I

Finishing Machinery.
See Dyeing, Drying, Bleaching and Finishing

Fireproof Construction.
The Berlin Iron Bridge Co., East Berlin, Conn.

Fluted Rolls.
Cohoes Foundry & Machine Co, Cohoes, N.Y
Thurston, A. G, & Son, Box 528, Fall River Mass.

Forges.
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Boston.

Friction Clutches.
See Clutches.

Friction Hoisting Drums.
Eastern Machinery Co., New Haven, Conn.

Fulling Mills for Woolen Goods.
Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter Jas, Machine Co, No. Adams, Mass.

Gas Engines.
Jones, Lewis, 60½ and Media Sts, Phila, Pa.

Gas Exhausters.
Sturtevant Co., B F., Boston.

Gas Singeing Machines.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Ms.
Granger Foundry & Machine Co., Providence, R. I.
Rusden Machine Co., Warren, R. I.

Gear Cutting Machine.
Whiton, The D. E, Co, New London, Conn.

Generating Sets.
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F , Boston.

Heating.
See Ventilating.

Heddles.
Watson, L. S, Mfg. Co, Leicester, Mass.

Hoisting Machinery.
The Eastern Machinery Co. New Haven, Conn.

Hose.
Boston Belting Co., Boston.

Hosiery Boards.
Pearson, J. T, Kensington, Pa.

Humidifying Apparatus.
American Air Moistening Co., Boston.

Hydro Extractors.
American Tool & Machine Co , Boston.
Rusden Machine Co., Warren, R. I.

Knit Goods Edgings, Trimmings, etc.
Cathcart, John & Co., 115 Franklin St., New York.
Cheney Bros, Silk Goods, 479 Broome St, N. Y.
Friedberger & Co, Edgings, Germantown Phila, Pa.
Fleming & Chapin, Philadelphia.
Hepner & Horwitz, Lacings, 99 Howard St, N. Y.
Kavanaugh, Geo. W., Cohoes, N. Y.
Krout & Fite Mfg. Co, Allegheny Ave. and Emerald St., Phila.
Weimar Bros, 1817 East York St, Phila Pa.

Knit Goods Finishing Machines, Crochet, Etc.
Merrow Machine Co, The, Hartford, Conn.
Nye & Tredick, 606 Arch St, Phila, Pa.
Scott & Williams, 2079 E. Cumberland St, Phila Pa.

Knitting Machine Cylinders.
Paxton & O'Neill, 129 Bread St, Phila, Pa.
Stafford & Holt, Little Falls, N. Y.

Knitting Machinery.
Beattie, Wm. & Son, Cohoes, N. Y.
Branson Machine Co., 506 John St., Philadelphia.
Campbell & Clute, Cohoes, N. Y.
Cooper, Chas, Bennington, Vt.
Crane Mfg. Co, Lakeport, N. H.
Excelsior Knitting Machine Manufacturing Co., Allentown, Pa.
Fisher Knitting Machine Co., Utica, N. Y.
Franklin Transfer Co., Franklin Falls, N.H.
Hepworth & Co, Lehigh Ave. and Mascher St, Phila, Pa.
Jenckes, E. Mfg. Co, Pawtucket, R. I.
Jones, Lewis, 60 1-2 and Media Sts, Philadelphia, Pa.
Kennedy, Thos. (Cutters, etc.), Cohoes, N. Y.
Leighton Machine Co, Manchester, N. H.
Lindley, Geo. W., 5122 Wakefield St., Germantown, Pa.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
McMichael & Wildman Mfg. Co, Norristown, Pa.
Nye & Tredick, 606 Arch St, Phila, Pa.
Paxton & O'Neill, 127 Bread St, Phila, Pa.
Pepper Mfg. Co, Lakeport, N. H.
Scott & Williams, 2079 E. Cumberland St., Phila., Pa.
Snyder, Homer P. Mfg. Co. Little Falls, N. Y.
Stafford & Holt, Little Falls, N. Y.

Knitting Needles and Supplies.
Breedon, Wm, & Son, Amsterdam, N. Y.
Cooper, Chas, Bennington, Vt.
Corey, Wm, Co, Manchester, N. H.
Crane Mfg. Co , Lakeport, N. H.
Dodge Needle Co., Manchester, N. H.
Ives, Loyal T, New Brunswick, N. J.
Kavanaugh, Geo. W., Cohoes, N. Y.
Lydall, H, & Foulds, Manchester, Conn.
Manufacturers' Supplies Co., 66 No. 4th St. Philadelphia.
Mayo Knitting Machine & Needle Co, Franklin, N. H.
Page Needle Co , Chicopee Falls, Mass.
Treat, Orion, Manchester Green, Conn.
Wardwell Needle Co, Lakeport, N. H.

Laboratory Outfits.
Bullock & Crenshaw, 528 Arch St. Phila, Pa

Looms.
Crompton & Knowles Loom Works, Worcester, Mass.
Draper Company, Hopedale, Mass.
Fairmount Machine Works, 22d and Wood Sts. Philadelphia.
Furbush, M. A, & Son Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St , Phila Pa. (For wire.)
Kilburn, Lincoln & Co, Fall River, Mass.

Leigh, Evan A., 35 Mason Bldg., Boston.
Lowell Machine Shop, Lowell, Mass.
Mason Machine Works, Taunton, Mass.
Whitin Machine Works, Whitinsville, Ms.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Lubricators
Ameledema Oilless Bearing Co., Berkeley St, Wayne Junction, Philadelphia.
Dixon, Jos., Crucible Co, Jersey City, N. J.

Lumber.
Stearns, A. T, Lumber Co, Neponset, Mass.

Lumpers.
Gerry, George, & Son, Athol, Mass.

Machinery Dealers.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Schofield, Geo. L. Phila., Pa.

Machinists' Tools.
Whiton, The D. E. Co, New London, Conn.

Mails.
Walder, J, Paterson, N. J.

Mechanical Draft.
Buffalo Forge Co., Buffalo, N. Y.
Sturtevant Co., B. F., Boston.

Measuring and Folding Machines.
Curtis & Marble Machine Co, Worcester, Ms.
Elliott & Hall, 544 Hermon St, Worcester Mass.

Mercerizing Machinery.
Butterworth, H. W. & Sons, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Rusden Machine Co., Warren, R. I.

Mill Brushes.
See Brushes.

Mills For Sale.
Denny, R. B., 143 Federal St., Boston.

Mill Builders and Engineers.
Berlin Iron Bridge Co, The, East Berlin, Ct
Ferguson, John W, Paterson, N. J.

Mill Supplies.
American Supply Co, Providence, R. I.
Bamford & Smith, Pascoag, R. I.
Bristol, The, Co., Waterbury, Conn.
Buckley's, Benj. Son, Gun Mill, Paterson, N. J.
Dixon Lubricating Saddle Co., Bristol, R.I.
Easton-Burnham Co., Pawtucket, R. I.
Frost, Geo. T., Paterson, N. J.
Jefferson, Ed, & Bro, 28 Strawberry St, Phila, Pa.
Jeffrey Manufacturing Co., Columbus, O.
Thurston, A. G, & Son, Fall River, Mass.
Watson, L. S, Mfg. Co, Leicester, Mass.

Napping Machines.
American Napping Machine Co, Williamstown, Mass
Ardrey, S. B, & Sons, Bristol, Pa.
Curtis & Marble Machine Co, Worcester, Mass.
Jones, Lewis, 60 1-2 and Media Sts., Philadelphia, Pa.

Noils (silk.)
Champlain Silk Mills, Whitehall, N. Y.
Ryle, Wm & Co., 54 Howard St., N. Y.
Malcolm Mills Co., Frankford, Pa.

Packing.
Boston Belting Co., Boston.
Jenkins Bros., New York.

Pantagraphs for Mill Engraving.
Johnson, C. A, & Co, 22 Dey St, New York.

Patterns of European Novelties.
European Pattern Supply Co., 530 Broadway, N. Y.

Patent Solicitors.
Crosby & Gregory, 34 School St, Boston, Mass.
Siggers, E. G., Washington D. C.
Wright, Brown & Quinby, 53 State St, Boston, Mass.

Perforated Metal.
Beckley, A. J. & Co., Garwood, N. J.
Fraser & Chalmer, Chicago, Ill.
Harrington & King Perforating Co., 230 North Union St, Chicago. Ill.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co., 100 William St, New York.

Picker Sticks.
Loom Picker Co., Biddeford, Me.

Picking, Carbonizing and Garnetting.
Garfield Woolen Co, Garfield, N. J.

Pipe Covering.
Keasby, R. A. 83 Warren St, New York.
Norristown Covering Co., Norristown, Pa.

Pneumatic Conveying.
See Ventilating.

Power Transmitting Machinery.
Ameledema Oilless Bearing Co, 149 West Berkley St, Wayne Junction, Pa.
Channon, H. Co, 35 Market St, Chicago, Ill.
Christiana Machine Co., Christiana, Pa.
Eastern Machinery Co, New Haven, Conn.
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunter, Jas, Machine Co, No. Adams, Mass.
Jeffrey Manufacturing Co., Columbus, O.
Kilburn, Lincoln & Co, Fall River, Mass.
Link Belt Machinery Co, Chicago, Ill.
Rusden Machine Co., Warren, R. I.
Saginaw Manufacturing Co., Saginaw, Mich.

Presses.
Boomer & Boschet Press Co., 338 West Water St., Syracuse, N. Y.
Butterworth, H. W. & Sons Co., Philadelphia
Crawford, J. J, & Son, Nashua, N. H. (Power Screw, Hydraulic, Hollow Steam Plate.)
Curtis & Marble Machine Co, Worcester, Ms.
Hart, Charles, Frankford, Philadelphia.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Phillips Co, The Thomas, Providence, R. I.
Woonsocket Machine & Press Co, Woonsocket, R. I.

Printers (Fabrics and Yarn.)
Capstick, John & Sons, Montville, N. J
American Yarn Printing Works, Philadelphia.

Pulleys.
See Power Transmitting Machinery.

Pulley Covers.
Warren Mfg. Co., Chicago, Ill.

Pumps.
Goulds Mfg. Co, Seneca Falls, N. Y.
Rusden Machine Co., Warren, R. I.

Quills.
Parker, Henry, Co., Springfield, Vt.

Reed and Harness Manufacturers.
American Supply Co, Providence, R. I.
Walder, J, Paterson, N. J.

Remnants.
Schloss' Son, N. J. & Co., 594 Broadway, N. Y.

Ribbons.
Cheney Bros, S. Manchester, Ct.

Ring Travellers.
National Ring Traveller Co., Providence, R. I.
Morley Button Mfg. Co., Boston.

Roofing Asphalt.
Warren Bros. Co., 143 Federal St., Boston.

Roofing, Gravel, Slag and Composition.
Armitage Mfg. Co, Richmond, Va.
Eastern Granite Roofing Co., Jersey City N. J.

Roofing, Paint and Paper.
Armitage Mfg. Co, Richmond, Va.
Warren Bros. Co., Boston, Mass.

Rope Transmission.
American Mfg. Co., New York.
Channon, H. Co., Chicago.

Roving Cans.
Hill, James Mfg. Co., Providence, R. I.
N. E. Ventilating & Heating Co, 980 Manton Ave. Providence, R. I.
Laminar Fibre Co., No. Cambridge, Mass.
Walrus Fibre Mfg. Co., Medford, Mass.

Rubber Covered Rollers and Goods.
Boston Belting Co., Boston.

Saddles and Stirrups.
Dixon Lubricating Saddle Co., Bristol, R. I.

Schools.
American Correspondence School of Textile, New Bedford, Mass.
Lowell Textile School, Lowell, Mass.
Philadelphia Textile School, Phila, Pa.

Screens (Perforated.)
See under Perforated Metal.

NEW ENGLAND
COTTON YARN COMPANY,

BRANCHES: BENNETT, HOWLAND, ROTCH, N. B. SPINNING, COHANNET, NEMASKET, GLOBE, SANFORD.

650,000 SPINDLES.

Cotton Yarns FOR WARP and HOSIERY TRADES, Carded and Combed, single and twisted, from American Peelers, Sea Island, Peruvian and Egyptian Cotton.

Colored Yarns Solids, Mixes and Randoms.

Bleached Yarns All numbers single and plies.

Fine Yarns For Electrical Trade a specialty.

Main Office, 37 North Water Street, NEW BEDFORD, MASS.

Sewing Machines and Supplies.
American Machine Co., 420 Library St., Phila.
Birch Bros., Somerville, Mass.
Curtis & Marble Machine Co, Worcester, Mass.
Excelsior Sewing Machine Co., Philadelphia.
Industrial, The, Mfg. Co., Camden, N. J.
Manufacturers' Supplies Co., 66 No. 4th St., Philadelphia.
Nye & Tredick, 606 Arch St, Phila, Pa.
Rusden Machine Co., Warren, R. I.
Standard Sewing Machine Co, Cleveland, Ohio.
Scott & Williams, 6th and Arch Sts, Phila, Pa.

Shearing Machinery.
See Dyeing, Drying, Bleaching and Finishing.

Shell Rolls.
Cohoes Foundry & Mach. Co, Cohoes, N. Y.
Thurston, A. G, & Son, Box 528, Fall River, Mass.

Shoddies.
See Wool Shoddies.

Shuttles.
See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.
Butterworth, H. W. Sons Co, Philadelphia.
Granger Foundry & Machine Co., Providence, R. I.
Knapp, C. H., Paterson, N. J.
Mason Machine Works, Taunton, Mass.
Rusden Machine Co., Warren, R. I.

Singe Plates.
Butterworth, H. W. Sons Co., Philadelphia.
New Bedford Copper Co, New Bedford, Mass

Sizing, Starch and Gums.
Stein, Hirsch & Co, 165 Duane St, New York.

Slashers.
Cohoes Foundry & Machine Co, Cohoes, N. Y.
Lowell M chine Shop, Lowell, Mass.
Phillips C · The Thomas, Providence, R. I.

Soaps.
India Alkali Works, Boston, Mass.

Spindles.
Bamford & Smith, Pascoag, R. I.
Buckley, Benj's, Sons, Gun Mill, Paterson, N. J.
Draper Company, Hopedale, Mass.
Easton-Burnham Co., Pawtucket, R. I.
Ward & Vandegrift, Elmer, N. J.
Whitin Machine Wks, Whitinsville, Mass.

Spindle Hook Bands.
Geo. T. Frost, Paterson, N. J,

Spindle Tubes.
Bamford & Smith, Pascoag, R. I.

Spinning Cylinders.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Spinning Frames.
See Cotton Machinery.

Spinning Frames for Wool
Woonsocket Machine and Press Co., Woonsocket, R. I.

Spinning Rings.
Draper Company, Hopedale, Mass
Morley Button Mfg. Co., Boston, Mass.
Whitinsville Spinning Ring Co, Whitinsville, Mass.

Spinning Tubes.
Buckley, Benj's. Son, Gun Mill, Paterson, N. J.

Spools. *See Bobbins, Spools Shuttles, Etc.*

Sprinklers.
International Sprinkler Co., Philadelphia, Pa.

Stamps and Checks.
Michael, A. M. Albany, N. Y.

Steam Boilers.
Brown, C. H, & Co, Fitchburg, Mass.
Lee-Odlum Co., Memphis, Tenn.
Pendleton, Walter & Co., New York.

Steam Boiler Compound.
Straus & Co., 55 Broad St., New York.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co, Hartford, Conn.

Steam Engines.
American Blower Co., Detroit, Mich.
Brown, C. H, & Co, Fitchburg, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Hooven (The), Owens & Rentschler Co, Hamilton, O.
Pendleton, Walter & Co., New York.
Rusden Machine Co., Warren, R. I.
Sturtevant, B. F. & Co., Boston.

Steam Surface Coverings.
Keasbey, Robert A., New York.
Norristown Covering Co., Norristown, Pa.

Steam Specialties.
Butterworth, H. W. Sons Co., Philadelphia.
Rusden Machine Co., Warren, R. I.
Jenkins Bros., New York.
Sturtevant Co., B. F., Boston.

Steam Valves.
Jenkins Bros., New York.

Tanks, Tubs and Vats.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Corcoran, A. J, 11 John St, New York.
Cypress Lumber Co, Apalachicola, Fla.
Lee-Odlum Co., Memphis, Tenn.
Rusden Machine Co. Warren, R. I.
Stearns, A. T, Lumber Co, Neponset, Mass.
Woolford, George, 2240 No. 9th St, Phila, Pa.

Tapes, Braids and Edgings.
Cathcart, John, & Co, 115 Franklin St, N. Y.
Fleming & Chapin, Philadelphia.
Friedberger Mfg. Co, Germantown, Pa.
Krout & Fite Mfg. Co., Allegheny Ave. and Emerald St., Philadelphia.
Weimar Bros, 1817 East York St, Phila, Pa.
Young, Wm. M, 3638-40 Frankford Ave, Philadelphia, Pa.

Telephones.
Mianus Electric Co., Mianus, Conn.
Philadelphia Electric Construction Co., Philadelphia.
Plummer, F. O. 620 Atlantic Ave., Boston.

Tentering Machines.
See Dyeing, Bleaching Machinery, Etc.

Tension Pulleys.
Amelectema Oilless Bearing Co., Wayne, Junc., Phila. Pa.
N. E. Ventilating & Heating Co, 930 Manton Ave, Providence, R. I.

Testing Machines.
Howard, Geo. C., 1783 Barker St., Phila., Pa

Thermometers, Hygrometers, Etc.
Neubeck, Aug. & Co., 92 Fulton St., N. Y.

Towers.
Caldwell Co., W. E. 202 Brook St., Louisville, Ky.
Lee-Odlum Co., Memphis, Tenn.

Trimmers.
The American Machine Co., 420 Library St., Philadelphia.
Excelsior Sewing Machine Co, Philadelphia.

Turbines.
(See Water Wheels.)

Valves—Rubber.
Boston Belting Co., Boston, Mass.

Ventilating Apparatus.
Allington & Curtis Mfg. Co., Saginaw, Mich., 81 Wareham St., Boston.
American Air Moistening Co., Boston.
American Blower Co., Detroit, Mich.
Berger Bros. Co., 231-237 Arch St., Philadelphia.
Berry, A. Hun, 23 W. 1st St, Boston, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Gosline, D. P., Boston.
Mattern, Geo. 44 East 8th St., New York.
New England Ventilating & Heating Co, Providence. R. I.
New York Blower Co., New York.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philapelphia.
Philadelphia Textile Machinery Co, Hancock St, above Lehigh Ave, Phila, Pa.
Sargent's, C. G., Sons, Graniteville, Mass.
Sturtevant, B. F. Co, 34 Oliver St, Boston, Mass.

Washers (Cloth).
Birch Brothers, Somerville, Mass.
Butterworth, H. W. & Sons Co., Philadelphia.
Hopkins, Machine Works, Bridgeton, R. I.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Phillips Co, The Thomas, Providence, R. I.
Rusden Machine Co , Warren, R. I.

Watchman's Clocks.
Eco Magneto Clock Co, 620 Atlantic Ave, Boston.
Nanz & Co, 127 Duane St., New York.
Philhdelphia Electric Construction Co., 1328 Chestnut St., Philadelphia.
Waggoner Watchman Clock Co., Grand Rapids, Mich.

Water Wheels.
Bradway, C. P., W. Stafford, Ct.
Christiana Machine Co., Christiana, Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Leffel, James, & Co, Springfield, O.

Water Wheel Governors.
Bradway, C. P, West Stafford, Ct.
Cohoes Foundry & Machine Co, Cohoes N. Y.
Leffel, James & Co, Springfield, Ohio.
Lombard Water Wheel Governor Co, 61 Hampshire St, Boston.

Winders. (Hosiery.)
Universal Winding Co, 226 Devonshire St, Boston.

Wire Cloth.
Fraser & Chalmer, Chicago, Ill.

Wood Pulleys.
Saginaw Manufacturing Co, Saginaw, Mich.

Wool Cleaning Compound.
India Alkali Works, Boston.

Wool Combing Machinery.
Crompton & Knowles Loom Works, Worcester. Mass.
Leigh, Evan A. 35 Mason Bldg., Boston.

Wool Extracts.
Garfield Woolen Co, Garfield, N. J.

Wool and Waste Dusters.
Gerry, Geo, & Son, Athol, Mass.
Sargents', C. G., Sons, Graniteville, Mass.
Stillman-Randall Machine Co, Westerly, R. I.

Woolen and Worsted Machinery.
Altemus, W. W, & Co, 2816 N. 4th St, Phila Pa.
American Tool and Machine Co., Boston.
Birch Brothers, Somerville, Mass.
Butterworth, H. W. Sons Co., Philadelphia.
Curtis & Marble Machine Co, Worcester, Mass
Fairmount Machine Works, 22d and Wood Sts, Philadelphia.
Furbush, M. A. & Son Machine Co, Phila, Pa.
Howard, Geo. C., 1783 Barker St., Phila., Pa.
Hunt, Rodney, Machine Co, Orange, Mass.
Hunter, Jas, Machine Co, No. Adams, Mass.
Hunter, Robert 1525 Clearfield St., Frankford, Phila.
Jefferson, Ed. & Bro, 28 Strawberry St, Phila, Pa.
Kenyon D. R. & Son, Raritan, N. J.
Leigh, Evan A. 35 Mason Bldg, Boston.
Parks & Woolson Machine Co., Springfield, Vt.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Philadelphia Textile Machinery Co., Hancock and Somerset Sts., Philadelphia.
Phillips Co. The Thomas, Providence, R. I.
Roy, B. S. & Son, Worcester, Mass.

Rusden Machine Co., Warren, R. I.
Sargent's, C. G., Sons, Graniteville, Mass.
Schofield, Geo. L., Philadelphia.
Smethurst, Geo. (Gears for Mules), Maynard, Mass.
Stoddard, Haserick, Richards & Co, Boston, Mass.
Woonsocket Machine & Press Co Woonsocket, R. I.

Wool, Hair and Noils.

Becker, Chas. W, Agt, Amsterdam, N. Y.
Fowles & Co, 106 Church St, Phila.

Wool Shoddies.

Becker, Chas. W, Agt, Amsterdam, N. Y
Garfield Woolen Co, Garfield, N. J.
Slack, Wm. H. B., & Bro, Springfield, Vt.

Wool Washing, Preparing and Drying Machinery.

Hunter, Jas. Machine Co., No. Adams, Mass.
Philadelphia Drying Machinery Co., 6721 Germantown Ave., Philadelphia.
Phillips Co, The Thomas, Providence, R. I.
Sargent's, C. G, Sons, Graniteville, Mass.

Woolen Commission Merchants.

Hayes, O. H. & Co., New York.

Yarns, Threads, Etc.

Banding.

Frost, Geo. T , Paterson, N. J.
Moore, C. & Co. 12 S. 5th St, Phila, Pa.
Warren, W, Thread Works, Westfield, Mass.
Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Cotton Yarns.

American Cotton Yarn Exchange, 67 Chauncy St., Boston.
Catlin & Co, New York and Boston.
Eddy & Street, Providence, R. I.
Spring St., N. Y.
Eichmann & Sternberg, New York.
Germantown Spinning Co, Germantown, Pa.
Grant Yarn Co, Fitchburg, Mass.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Indian Orchard Co., Indian Orchard, Mass.
Jenckes, E., Mfg. Co., Pawtucket, R. I.
Mitchell, Jas. E, & Co, Boston and Phila, Pa.
Montgomery, J. R, Co, Windsor Locks, Ct.
Monument Mills, Housatonic, Mass.
New England Cotton Yarn Co , New Bedford, Mass.
New England Thread Co., Pawtucket, R. I.
Orswell Mills, Fitchburg, Mass.
Tucker & Cook Mfg. Co, Conway, Mass.
Whittier Cotton Mills, Lowell, Mass.

Gassed Yarns.

Eichmann & Sternberg, New York.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
New England Cotton Yarn Co., New Bedford, Mass.

Glazed Yarns.

Indian Orchard Co., Indian Orchard, Mass.
Lorimers, Wm. H. & Sons Co., Philadelphia.
Malcolm Mills Co, Frankford, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
New England Thread Co., Pawtucket, R. I.
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Harness Twines.

Cranston Worsted Mills, Bristol, R. I.
Fawcett, Hughes, 115 Franklin St., N. Y.
Moore, C , & Co., (S. W. cor. 5th and Market Sts.)
Warren, W, Thread Works, Westfield, Mass
Whittier Cotton Mills, Lowell, Mass.

Hosiery and Knitting Yarns.

Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo. & Co, Phila, Pa.
Champlain Silk Mills, Whitehall, N. Y.
Clark, Wm, Co, Westerly, R. I.
Cranston Worsted Mills, Bristol, R. I.
Germantown Spinning Co, Germantown, Pa.
Greene & Daniels Mfg. Co, Pawtucket, R. I.
Hyde, E. S, 223 Chestnut St, Phila, Pa.
Jenckes, E., Manufacturing Co, Pawtucket, R. I
Mitchell, James E, & Co, Phila. and Boston
Monument Mills, Housatonic, Mass.
New England Cotton Yarn Co., New Bedford, Mass.
Orswell Mills, Fitchburg, Mass.
Skerry, A T, & Co, 47 Leonard St, N. Y.
Walcott & Campbell Spinning Co, New York Mills, Oneida Co, N. Y.
Warren, W, Thread Works, Westfield, Mass.
Whittier Cotton Mills, Lowell, Mass.

Flax, Hemp, Jute and Ramie.

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Mohair Yarns.

Cranston Worsted Mills, Bristol, R. I.
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Novelty Yarns, Tinsels, Silk Noils, Etc.

Champlain Silk Mills, Whitehall, N. Y.
Cranston Worsted Mills, Bristol, R. I
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Malcolm Mills Co, 229 Chestnut St, Phila, Pa.
Montgomery & Co, J. R, Windsor Locks, Ct.
Skerry, A. T, & Co, 47 Leonard St, N. Y.

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Cheney Bros, S. Manchester and Hartford Ct.
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Ryle, Wm, & Co, 54 Howard St, N. Y.

Woolen and Merino Yarns.

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Solis, Andrew J, Jr, & Co, 179 Devonshire St, Boston, Mass.

Worsted Yarns.

Alleghany Worsted Mills, Phila, Pa.
Boyer, B. F, & Co, Camden, N. J.
Campbell, Geo. & Co, Phila, Pa
Campion, Richard, 17 Bank St., Philadelphia.
Cranston Worsted Mills, Bristol, R. I.
Croft, Howland, & Sons, cor. Broadway and Jefferson Ave., Camden, N. J.
Herbst & Jones, 21st and Naudain Sts Philadelphia, Pa.
Pocasset Worsted Co., Thornton, R. I.
Skerry, A. T, & Co, 47 Leonard St, N. Y.
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1686 **Cotton Supt.** Age 33; American; married. Large experience. Been in present position as superintendent for a number of years and previously in the same mill as overseer of weaving. Nearly all kinds of goods. Is familiar with nearly all makes of machinery. Refers to past employers.

1706 **Cotton Supt.** Age 39; American. Has started several small mills. Understands business from bale cotton to finished cloth. Has made yarns from 8's to 26's run into plaids, ginghams, etc., and is familiar with most all machinery. Can furnish references. Prefers Southern States.

1608 **Supt. of Yarn Mill.** A young man, 30, married, and competent to fill a good position with credit. Honest, temperate and excellent business training and judgment. Thorough manager and salesman, and keenly alive to conditions of today.

1689 **Supt. or Assistant Supt.** Age 37; American; married. Large experience as overseer and first-class references. At present employed as overseer, but is capable of filling a superintendent's position. Worked on prints, twills, sheetings, cambric and fancies.

1653 **Supt.** of a small mill, or overseer of carding and spinning in a large mill. Has had seven years' experience as overseer and supt. in good mills. Is thoroughly posted on both gray and colored work. Has a thorough knowledge of designing, and understands all makes of machinery. Married, and good habits. At present employed as assistant superintendent in the South.

1673 **Cotton Supt., Carder, and Spinner.** Age 23; English; single. Large experience in English mills. Can take position at once. Has worked on all kinds of cotton machinery.

1671 **Supt.** desires position in Southern States as supt. of cotton mill or overseer in large room, any department. Age 42; married. Has had experience on all classes of white and colored work, both North and South. Has been South twenty years. At present employed, but wants better position. Best of references.

1432 **Desires Position as Superintendent** of cotton mill, or would take overseer of carding in large mill, where good wages can be secured. Age 31; married.

WOOLEN CARDERS.

1600 **Boss Woolen Carder** or would take a good secondhand job. Now employed, but desires to change for good reasons. Many years' experience in mills on American and English carding machinery. Age 41; American, married. Can start at once.

1082 **Boss Woolen Carder.** Has had many years' experience, working as secondhand ten years with one of the best known carders of today, and has made a study of imperfections in the card room and how to remedy them. Has been boss carder in present mill five years, which is now shut down settling up estate, and if an opportunity was offered him before it was started, would accept. Best of references. Age 32; married. Underwear and hosiery yarn.

1696 **Carder,** or secondhand. Experienced on cassimeres, cloakings, blankets, shawls, jeans, and is familiar with Fu bush, Bridesburg and Smith cards. Wants position in Western or Southern States. Can take place immediately. Age 30; American; single.

1701 **Boss Carder.** Age 39; English; married. Has had large experience as boss carder in Canadian mills, and has worked in New England mills, also held positions in England before coming to this country. He has worked on all kinds of wool, cotton, waste, mungo and shoddy mixes, cassimeres, dress goods, knit goods and blankets. Can take position at once. Excellent references.

1707 **Overseer of Carding.** Worked for 21 years in a woolen mill as boss carder, but through sickness was obliged to resign his position. Is now ready and wants a situation at once. Age 49; American; married. Wants $3 a day. Has worked on dress goods and flannels.

1643 **Woolen Carder.** Age 45; American; married. Has worked as overseer in first-class N. E. mills for the past 18 years. He is at present employed, but wishes to better himself. Could leave on a week's notice. Has worked on cassimeres, dress goods, flannels and underwear. A good manager of help and thoroughly competent and reliable.

COTTON CARDERS.

1403 **Cotton Carder** with 17 years experience in N. E. mills as overseer and second hand, now in the South but wants to return North. Has never worked for less than $3.00 but would take $2.50 to change. Married. Age 38. Best of references.

1593 **Overseer Cotton Carding and Combing.** Now in charge of this department in a large N. E. mill. Has had first-class experience and is well recommended. Age 38; married, American. All grades of cotton.

1596 **Cotton Comber and Carder.** Young man with 10 years' experience in N. E. mills. Would like position as overseer or second-hand. Is well recommended. Married. Will start at $2.50 per day.

1662 **Overseer Cotton Card Room.** Age 53; American, married. Not employed at present and could take a position at once. Has worked on all kinds of goods in order mills, and is familiar with all kinds of machinery. Refers to former employers.

WOOLEN SPINNERS.

1648 **Boss Woolen Spinner.** 47 years old. 28 years' experience. Worked on all kind of stock, from ¼ to 12 run. Temperate, steady, and refers to past employers. Will work for moderate salary. Not employed and could come at once. Experience on cassimeres, flannels, beavers, knit goods dress goods, blankets, shawls.

1519 **Overseer of Woolen Spinning.** Age 31; married. Has worked on yarns from 1 run down to 5½. Some experience on shoddy. Will work for moderate salary.

1595 **Overseer Worsted Spinning.** 10 years as overseer of spinning, twisting, reeling, dressing, spooling on worsted yarns. Englishman; age 41, married. Now employed, but does not like section of country. A first-class man in every respect.

633 **Woolen Mule Spinner** desires to move from Maine on account of wife's health. At present in good position. Age 37; married, Scotchman.

1601 **Woolen Spinner or Secondhand.** Experience in hosiery and cloth mills. Will accept small wages to get started in satisfactory position.

1503 **Boss Spinner.** Age 38. Has worked on kerseys, meltons, cloakings, dress goods, carpet yarns, etc. Good references.

COTTON SPINNERS.

1636 **Overseer Cotton Spinning, Spooling, Warping, Etc.** Has held position seven years of second-hand and has taken textile school courses. Having had unusual opportunities to learn, he feels competent to take position as overseer. Highly recommended by present employers.

1655 **Overseer of Cotton Spinning.** 42 years old; married. Experience as a spinner covers a period of 30 years in first-class N. E. mills. Has worked principally on fine yarns, 30's to 200's. Had some experience on coarse numbers. First-class references.

1364 **Mules or Frames.** 34 years old; married. Thoroughly understands all makes of English and Mason mules. Has set up machinery and been expert fixer. Wants good position as overseer of mule room, or would take charge of frames. Accept $3.50 per day. Best references.

1663 **Overseer Mule Room.** Eleven years' experience in Fall River mills, and for the past ten years overseer of mule room. Excellent reference from present employer. Age 44, married.

1698 **Overseer of Mules.** 34 years old; married; English. 10 years' experience, chiefly on English mules, on all grades of cotton yarn. Would like to get a large job.

1703 **Overseer Ring Spinning, Warping and Spooling.** Is experienced on white work from Nos. 4's to 30's. Is familiar with Whiton and Lowell Machine Shop spinning frames and spoolers and warpers. Wants $3 per day to start with. Age 39; American; married.

1690 **Cotton Mule Spinner.** Age 42; French; married. Has worked on prints and sheetings and on yarns from 9's to 50's. First class references. Two years' experience as secondhand and five as overseer. Wants $2.50 per day to start with.

WOOLEN WEAVERS.

1654 **Boss Woolen Weaver.** Has had 12 years' experience as fixer and two years' as boss weaver. Has worked on fancy worsteds, cotton worsteds and coverts. Is familiar with Crompton & Knowles machines. Age 37; English, married. At present employed. Can take a position with two weeks' notice.

1482 **Weaver or Wool Sorter.** Has worked on cassimeres, cheviots, tricots, kerseys and cloakings. Good references.

1645 **Overseer Weaving.** Age 30; married, American. Has worked in weave room since he was 17 years old as weaver, fixer and secondhand of weaving, except for a short time was traveling salesman. Has worked on ladies' dress goods, men's fine worsted suitings, overcoatings, cloakings, etc., on Crompton & Knowles and Jacquard looms. Excellent references.

1413 **Boss Weaver or Designer.** American; age 49. Has worked on beavers, kerseys, dress goods, cassimeres and all kinds of men's wear. Is also a good loom fixer.

1629 **Boss Weaver or Second-hand** of woolens or worsteds. Experience covers 10 years in N. E. mills from weaver to second-hand. Will accept a second-hand's position paying $2.50 a day. Well recommended.

886 **Boss Weaver or Boss Weaver and Assistant Supt.** Age 46; married. Has had large experience, and worked on cassimeres, cloakings and dress goods. Had been in last position, in charge of weaving, for eight years.

1688 **Overseer of Weaving** in large mill, designer in small mill, or assistant designer in a large mill. Age 38; German; single. Has worked on beavers, chinchillas, fine cassimeres, fine fancy worsteds, ladies' dress goods, army goods, union cassimeres and other classes of goods. Strictly temperate and industrious.

COTTON WEAVERS.

1681 **Overseer or Secondhand of Cotton Weaving.** Has had long experience as loom fixer, secondhand and overseer, and can furnish excellent references. Has also had charge of cloth hall and drawing departments. With one mill was 15 years.

1687 **Overseer of Weaving.** Age 30; Scotch; married. Has worked on taffetas, grogran, satins, serges and grenadines, all kinds of plain and fancy cottons and lenos. Is familiar with Crompton & Knowles and Whitin looms. Wants $4 per day.

1668 **Overseer of Weaving.** Age 41; English; married. Has had large experience as loom fixer and secondhand of weaving, and is competent to take an overseer's job. Has worked on shirtings, sheetings, sateens, fancy lenos, and all grades of fine goods all the way from 2 to 28 harness.

1652 **Overseer Cotton Weaving.** Worked on about all kinds of cotton goods. Age 41, American, married. At present employed in the South, but wants to change for a healthier locality. Refers to present and past employers.

1708 **Overseer of Weaving.** Has had 15 years' experience on 12 different kinds of looms and most all kinds of cotton goods. Has worked in some of the largest mills in the South.

KNITTERS.

1084 **Overseer of Knitting and Finishing.** Age 35; married. Has just resigned position in the South on account of climate, and is ready to take place at once. Can furnish best of references.

1641 **Boss Knitter.** Has had 18 years' experience on hosiery, cotton, fine lisle, woolen, worsted, plaited and mixed stock, on ladies', misses' and infants', shaker, also on all kinds of half hose from 108 to 200 needle and from 12 to 42 gauge on latch needle underwear machines and has worked on spring needle machines. Age 33; American; married.

598 **Boss Knitter or Supt.** Age 48; married. Is thoroughly familiar with the manufacture of all classes of seamless hosiery, and can take any position at short notice.

1694 **Asst. Supt.** or foreman of finishing room. Age 30; married; American. Large experience in first class mills, and excellent references. Thoroughly understands the manufacture of children's, men's and ladies' flat and fleeced lined goods and underwear. Can repair all kinds of sewing machines and can take position at once.

1657 **Foreman Seamless Hosiery.** Age 35; American, married. At present employed, but can take a position at short notice. Has worked on cotton and woolen hosiery. Wants $4.00 per day.

1666 **Underwear Knitter or Supt.** 12 years' experience on ribbed underwear on all kinds of yarns. Has worked for present employer for six years. Age 40; American; married.

1699 **Supt.** or overseer. Has had large experience as knitter, repairer and superintendent, and is familiar with nearly all makes of machinery. Age 44; married; American. Would like to engage with some strong financial parties to start a plant in the South to manufacture both stockings and underwear or cotton plushes and rubber linings.

DYERS.

1684 **Dyer.** Age 30. Been in business 12 years. Wants position at once. Will go anywhere. Is familiar with long chain, short skein and raw stock dyeing, and carpet warp.

1693 **Dyer.** English, of 30 years' experience on wool, fine worsted yarns, piece dyes, felt cloths, carpet yarns. Understands all the different kinds of indigo vats. Never yet been asked to show recommendations, never before being out of a position, only voluntarily. Would be willing to start in a small place and help to build it up. Understands making soap from all kinds of stock.

1702 **Dyer** or secondhand in hosiery or cloth mill. Age 26; American; married. Nine years' experience. Has worked on hosiery, wool, shoddy and mixed stock. Will work for moderate salary, and can take a position at once. Refers to past employers.

1704 **Boss Dyer.** Age 36; English; single. Is familiar with dyeing cotton yarn and warp both for bleaching, fulling and other purposes. Has dyed for the best firms in England, also for export work.

1705 **Boss Dyer.** Competent cotton dyer, with 15 years' experience, wants a steady place. Age 34 years. Hosiery.

DESIGNERS.

1635 **Designer** on colored cotton dress goods, and shirtings, and fancy worsted dress goods, piece dye, jacquard work in cotton, silk filling, also lappets. Would not consider position paying less than $1200 a year. Is at present employed in one of the leading mills, making fancy cotton, and is an especially bright young man. Early training in Scotland. Has been in this country about four years.

1383 **English Woolen Designer.** 20 years in leading Yorkshire and Huddersfield mills as designer, supt. and weaver. Very large experience and would accept moderate salary in good mill. Age 36; married, English.

1621 **Designer or Assistant Supt.** on men's wear worsteds, cotton worsteds, overcoatings, cassimeres. High and low stock. Has been designer in several first-class mills. Age 34; married.

1672 **Designer, Overseer of Weaving,** or assistant supt. Age 26; English; single. Has worked in various mills in England and this country. Holds first honors diploma for weaving and designing (London City Guilds). Fancy worsteds, dress goods, colored and fancy cotton goods.

1622 **Designer or Assistant Supt.** in woolen mill. Has made a specialty of steamer rugs and plaid back dress goods. Will start at $3 a day. Desires to change from present position on account of wife's health. An excellent opportunity to secure a first-class man at moderate wages.

1431 **Woolen Designer or Superintendent.** Young man, at present employed, desires to secure a position as above. Has been assistant superintendent of 18 set mill making fancy cassimeres and worsteds. Single. References show him to be a man of good ability.

1591 **Designer** on fancy worsteds, cotton worsteds, fancy cassimeres-tweeds, fancy back overcoatings, etc. Experience in first-class N. E. mills. Age 30. At present employed, but can accept position at once.

FINISHERS.

1526 **Foreman of Finishing Room,** Folding Packing, etc. Age 45; married; English. Has worked on white and colored goods and prints. Is acquainted with every kind of machinery used in his business. Has worked 11 years in this country. Can give good references.

1494 **Finisher on Felts,** or will take a position for the making of sizing. Age 26; single. His last position was engineer and in charge of sizing and finishing all classes of felts. Good references.

1351 **Boss Woolen and Worsted Finisher** is looking for a position paying $3.50 or more. Age 31; Has worked on all classes of woolen and worsted goods. Can furnish excellent references.

1661 **Overseer of Finishing.** Age 53; American, married. Large experience, and is familiar with Parks & Woolson and Curtis & Marble machinery. Has worked on cotton unions, dress goods, cassimeres, beavers, kerseys, coverts, army goods and worsteds. Can furnish excellent references.

1658 **Overseer Woolen Finishing.** Age 35; married. A number of years' experience as overseer in first-class N. E. mills. Worked principally on kerseys, meltons, unions and cassimeres, and is familiar with Curtis & Marble, Parks & Woolson and Cleveland machines. First-class references.

MISCELLANEOUS.

1418 **Secretary** in superintendent's or office of overseer of weaving. Is familiar with books in use in all departments. At present, makes out orders for goods from raw cotton, and follow to finished goods ready for shipment. Also keeps up stock of supplies of all kinds. Has re-arranged shipping and warehousing. Introduced and worked out his present system for running mill, which has proved successful.

1583 **Cloth Room Overseer.** A young man having good experience as overseer in plain and fancy mills desires to change. Has worked on nearly all classes of cotton goods, and is recommended as a first-class figurer and good manager of help. Can take charge of cloth department and shipping where both positions are combined, or would accept position as office assistant. American; married.

1685 **Boss Dresser or Assistant Designer.** Has taken a thorough course in designing, and is well up in calculations and in the making of fancy men's wear goods of all kinds. Has worked in Scotland and three years in this country. His knowledge of yarn calculations and practical experience as dresser tender makes him well fitted to fill a position as boss dresser and to run a room in an up to date and efficient manner, or to fill a position as designer or assistant.

1695 A young man would like to obtain a position in some Southern cotton mill as assistant supt., or some such position, where he would have an opportunity to learn the business thoroughly. Has theoretical and some practical knowledge.

1639 **Silk Supt. or Boss Weaver.** Experience covers ribbons, piece goods, velvets, jacquard, plain and plaids. Has had practical experience as loom fixer, designer and overseer. Early training in Germany and later in some of the best silk mills in this country. Also understands manufacture of corduroy.

1557 **Bleacher,** overseer or second hand. Well recommended, good training, reliable. Wants $2.50. Age 27; married.

1670 **Bleacher, Starcher or Finisher.** Age 44; English, married. Large experience. Will not work for less than $2.50 per day. Can furnish good references.

1667 **Overseer of Slashing, Spooling,** Warping and Drawing in. Age 39, and married. Has worked on all kinds of spoolers, warpers and slashers. Now employed as boss of slashing and drawing in, but is capable of handling a larger job than present one. Can furnish excellent references as to character, ability, etc.

1656 **A Practical Linen Spinner,** Weaver, Bleacher and Finisher of linen goods, also a practical linen finisher of cotton goods, over 27 years' experience in Ireland and America, is open for an engagement. Would go in with a company, putting his skill and ability against capital. Married. Best of references.

1659 **Bleaching Overseer.** Seven years' experience as overseer, and has first-class references. Has handled all classes of work in the cotton piece goods line, from heavy shoeduck, drills, etc. down to cheesecloth, and bag goods, also all kinds of colored work, such as colored bordered handkerchiefs, colored striped shirtings, colored spots, also white and colored towels, linen crash, all kinds of cotton flannels, etc.

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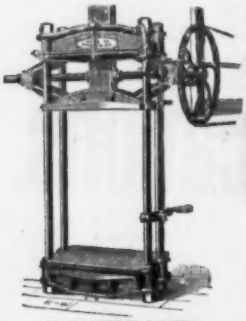

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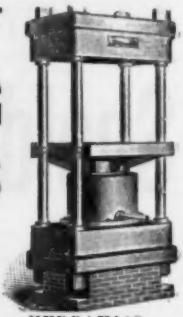

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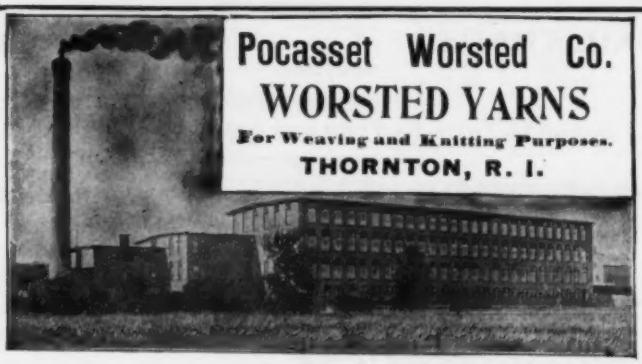

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Peeler, Egyptian, Mixed Colors.
Large Assortment.

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YARN DEPARTMENT.

Eastern Yarn Market.

Cotton Yarn. Spinners continue very busy, with prices firm and advancing. Spinners have more orders than they can fill. The time may come when the cotton spinner will not be so independent as is the case today. Underwear and hosiery knitters say that the spinners are so independent that it is not pleasant to deal with them, and they are waiting for the time when there will be another tale to tell. Many of the larger knitters are putting in their own spinning because of these high prices. The yarn has advanced 5 and 6 cents per pound, while cotton has not advanced over 1 cent per pound. The knitters feel that they are being imposed upon, but the demand for yarn continues, with knitters paying advance prices. The Southern yarn continues to advance and has advanced recently ½ to 1½ over the last prices established by the Southern mill understanding. The Southern yarns are so well made that Eastern manufacturers are beginning to investigate the expediency of manufacturing finer yarn and cloth. Northern yarn remains firm, and it is unsafe for knitters to take orders without first covering for yarn, as the upward tendency still continues. This has certainly been the grade time for cotton yarn, and has been brought about by the market adjusting itself to higher values; but this may change for woolen and merino goods at whatever the price may be. We already see this from the fact that many of the mills which have been using cotton for fleece-lined underwear are using merino wool yarn, which replaces, of course, the cotton yarn at a much higher price for the garment. Dress goods manufacturers are using large quantities of mercerized cotton yarn, and are producing good results. The woolen manufacturers are using large quantities of cotton to manufacture cotton worsteds which are selling so freely, and prices for this yarn, in 2/20s, 2/30s and 2/40s, continue high. The hosiery knitters continue using cotton yarn to meet the requirements of the trade, which demand a cheap article which cotton will only enable them to make. The knitters of combed yarn are all very much excited at the continued advance of combed yarn, and some who use large amounts of this yarn are contemplating building mills and selling their surplus, which at the present rate would mean a handsome saving on the yarn used and a profit on the yarn sold.

Worsted Yarn. Spinners continue busy with orders which were placed in October and November when the weavers were getting ready to make fortunes out of the heavy weight season--all ordered heavily of fine yarn. Those who got in early ordered at reasonable prices and these prices advanced as the excitement of the times increased. The heavy-weight season opened and instead of selling the mills' products in two or three days, as was the case of last season's business, the mills got scarcely any orders on fine worsted. The orders were placed mostly for cotton worsted, and goods made from ¼ to ⅜ blood stock. And thus the weavers bought yarns at high prices, anticipating one kind of business, and forced to another class entirely. The heavy-weight season cannot truly be said to have opened, as mills doing a legitimate business have not been sold up. The market, so far as the woolen trust is concerned, was over bought by buyers for the cheap grades of cloth, with a view to cancellation in the future, and oversold by manufacturers for fear of cancellations. This has been the case of all the mills run-

Frank E. Patterson, Prest. Oscar W. Wood,

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ning cheap lines of cloth, such as cotton worsteds. Worsted yarn is undoubtedly easier in price, although at least 10 to 15 cents per pound higher than in September. Weavers of fine cloth are substituting single yarn for 2-ply yarn in an endeavor to reduce the price of cloth. Weavers have yarn contracted for, but in the case of coarse yarns placed late in the season are not getting it fast enough and some spinners cannot accept further orders. The dress goods manufacturers are using much yarn in coarse grades, in 2/14s, 2/20s and 2/32s. Many are using very cheap class of yarn, and produce, by using half camel's hair yarn and yarn which runs almost to carpet yarn, a very serviceable and sightly cloth, mostly in plain effects. The weavers who stayed out of the market and refused to buy until the situation developed itself have by far the best of it on today's market. Spinners in December would not look at prices which today are gladly accepted. The situation, so far as yarn is concerned, is a peculiar one. Spinners are busy and have orders placed which will carry them along in some instances until June. The weavers who have bought are unable to make up their minds whether they have a "gold brick" or a "gold mine." The spinners in the meantime keep pushing the yarn to the buyers. The consequence is that the spinners are not suffering and really have no space for immediate delivery, although the future is not clear. Weavers who were hungry for yarn in December now hesitate and will not place orders. Fine yarn in cloth brings the cloth beyond the purchasing power of the country. Weavers who have largely bought believe that ½ blood qualities is good property. It is predicted that cheviot cloth and cheviot yarn is coming again in fashion, as prices can be made which seem to meet the popular demand. Weavers have been forced to get out new lines of samples, and orders have been placed on yarn

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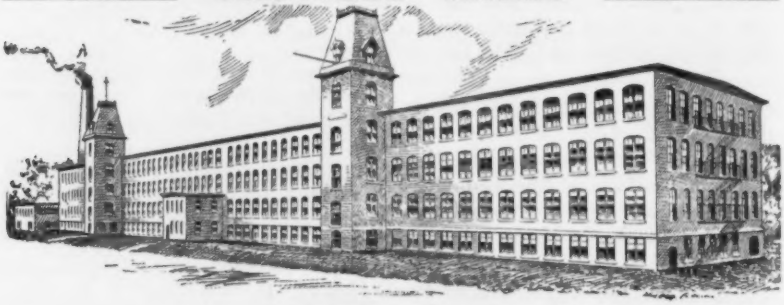

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The "Drosophore" and "Vortex" Humidifiers.

Legal proceedings will at once be taken against infringers and users of infringements.

WE HAVE, WITH INSTALLATIONS IN HAND, ORDERS FOR OVER 2,000 HUMIDIFIERS.

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from 2s to 26s single and ply.

SPECIALTY—FIRE HOSE CORD

and Yarns put up on tubes wound on Universal System.

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Manufacturers of - - - -

COTTON WARPS AND YARNS

In gray and all colors, single or in any twist.

COLORED COTTON

Machined, Carded or in Roving.

NOVELTY YARNS

In Cotton, Mercirized Cotton, Silk and Worsted, in various Patterns, Colors and Twists.
We are always pleased to assist our patrons of the Woolen Goods manufacture in special pattern warps for samples.
We use a uniform grade of long stapled cotton in all our manufacture.

which in November manufacturers would not look at. The orders are all for immediate delivery. The French yarn spinners continue busy and have booked many orders. The time is not far distant when knitters of underwear and hosiery will be again on the market. Some ordered early but many have not placed orders. The question is whether the lower price of fine wool will mean lower priced yarn, or whether the fact that the demand for this class of yarn is so much greater than the supply, will keep the price up and make it even higher, is what is bothering many knitters who will soon be on the market. Hosiery is consuming large quantities of French spun yarn. We note, however, that the supply will soon be greatly increased through the new French spinning mills which will by May 1st have much yarn for sale. Combers of tops continue busy although, instead of running fine wool, the demand at present is for ¼ to ⅜ blood tops. The new building which the woolen trust is erecting is located at Concord Junction, and will be built in sections. It is intended to be a wool store house, scouring and combing plant, and will require so much transportation that the trust will have to own its own freight cars. Every

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Successors to Kershaw Worsted Co.
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DYEING AND BLEACHING of All Kinds of Yarns and Narrow Fabric a Specialty. Best of Spring Water for Bleaching.

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Mills equipped with the latest and most improved machinery.

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Also 2, 3, 4, 5 ply and 6, 9 and 12 ply cable laid.

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Cotton Warps. ON BEAMS, JACK SPOOLS AND TUBES. IN FANCY TWIST COLORS AND PRINTED.

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Representative Lines of Woolens

O. H. HAYES & CO.

Liberal arrangements made with manufacturers or men controlling mills' productions.

one believes, after this mill starts, that there will be a great saving in the cost of combing. The combs will be taken out of the various worsted mills belonging to the trust and new ones will be added. Prices of yarns are easier for fine qualities and higher for ¼ to ⅜ blood yarn.

Woolen Yarn: Spinners continue well employed with work from all branches of the industry. All are working on orders for immediate delivery and have many orders for future delivery. Spinners are not anxious for instructions to start on future orders. Some lines of industry which have placed orders for future deliveries are undoubtedly not getting orders as early as anticipated, and some weavers who expected large orders for fine heavy weight cloth are not getting the business, and in many instances these orders will either be canceled or weavers will have to hold and store the yarn. There is a belief among the manufacturers that fine wool is too high, and many manufacturers are holding off buying until prices on fine wool reach a more normal state. These mills are generally on the market in April and May and if prices do not recede they will buy their yarn supplies from hand to mouth. Spinners are using noils largely and prices for noils are, in some instances, higher than wool. Dress goods manufacturers had anticipated much business from cloth requiring woolen yarn, but the demand still holds for worsted yarn. The weavers making overcoatings and other fabrics requiring cheap woolen yarn, are giving much employment to the spinners, and knitters of Jersey elderdown cannot get yarn fast enough. Spinners in a position to do so are getting many orders for French flannel yarns. The spinners are indeed busy, but the future is not clear, as but few new orders are forthcoming. The season seems backward and buyers are trying to work prices down. The knitters of 2-ply yarn for sweaters, etc., are busy and using much yarn.

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EICHMANN & STERNBERG
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Mercerized, Turkey Red, Gassed } Cotton Yarns.
Jacquard and Harness Twines.

Thread waste continues in demand, but the strange fact remains that wastes of all kinds are scarce and high in Europe.

Philadelphia Yarn Market.

The sharp advance in the cotton market, with the continued demand for yarn, has induced spinners to make further advances in yarn, the past two or three weeks. These advances are readily maintained, and the trade comes in and buys freely, placing large orders ahead.

The market seems to be held better all around this year than at any previous time. Conditions are unprecedented, and spinners, manufacturers and merchants find the only safe plan is to cover their contracts and wait.

The Southern spinners have made new lists, but they have been disregarded long ago, by agents, as they are getting considerable advance on the list now.

Eastern yarns are held at about the list price. We quote the following, as about market price today:—

Warps:—

20/1	18 to 18½
22/1	18½ to 19
26s	19½
16/1	17½ to 18
14/1	17 to 18
14/2	19

HOWLAND CROFT, SONS & CO.

LINDEN WORSTED MILLS.

Fine Worsted Yarns

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NOVELTY YARNS—of Mohair and Worsted. We are the only manufacturers in the United States making these yarns from the raw material to finished product and making Yarns **only.**

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Worsted Spinners.

Yarns, both French System and Bradford.

Knitting Yarns in all Grades and Mixes.
All Numbers to 60s.

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MANUFACTURERS OF

Novelty Yarns, Silk Noil Yarns, in Fast Colors AND White.

Mills, Frankford, Pa. Office, 220 CHESTNUT ST., PHILA.

16/2	19 to 19½
20/2	21½
30/2	28 to 28½
40/2	36 to 37
8/3	15½ to 16

Skein:—

8s to 10s soft	15½ to 16
14s	16¼ to 17
16s	17 to 17½
20s	17½ to 18½
19s	17½ to 18½
8/3 hard	15 to 15½
14/2	17½ to 18
16/2	17½ to 18
20/2	21 to 21½
30/2	27
9/4 slack	17½ to 18
8/2 soft	15½ to 16

Southern cones (various qualities):—

6s and 8s	16 to 17½
10s	16½ to 18
14s	18½ to 19½
18s	20 to 20½
20s	21 to 22
22s	22 to 23
24s	24
30s	26 to 28
40s	33 to 34

Shuttle cops:—

6s to 8s	16½
10s	16½ to 17
12s	16½ to 17
16s	17 to 17½

Eastern hosiery yarn, basis 18c. for 10s cops.

Eastern hosiery yarn, basis 18¾c. for 10s cones. Rise ¼c. per number to 15s.

Combed yarn, especially Egyptian, very scarce. The market is bare and mills are generally sold up so they can promise very little, except some months ahead.

Worsted yarn continues to advance, and is in great demand.

Woolen spinners are well sold up, and at good prices.

SILK NOILS AND SILK NOIL YARNS
IN WHITE AND COLORS.
MOHAIR LOOPS, KNOTS, AND FANCY YARNS FOR DRESS GOODS AND CLOAKINGS.
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Wool Scouring, Raw Stock in Piece.
Dyeing all shades. Unions and shades.

All work done by experienced workmen and guaranteed to give satisfaction.

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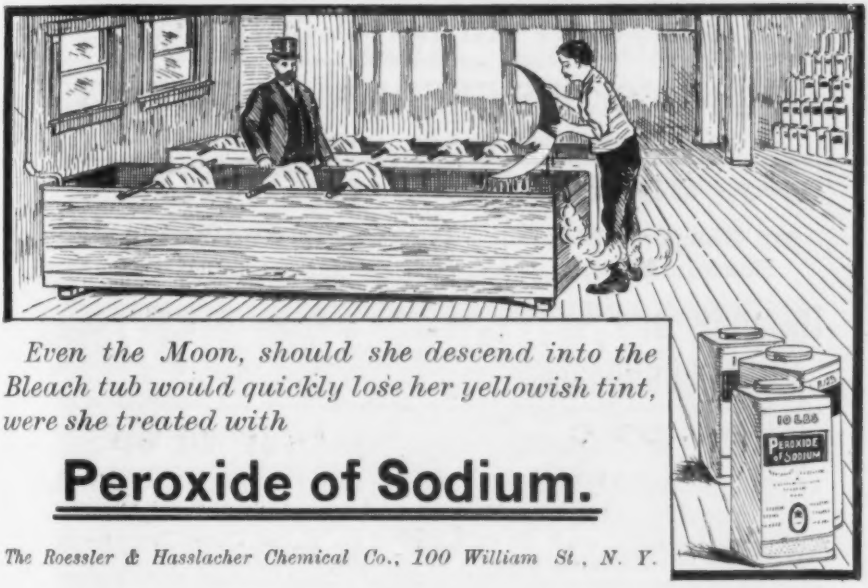

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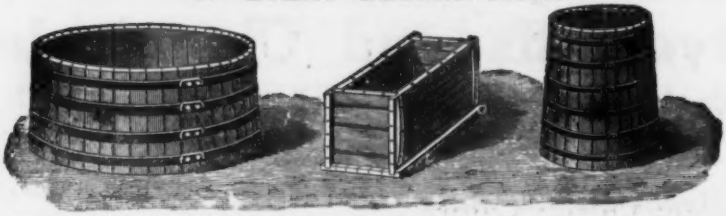

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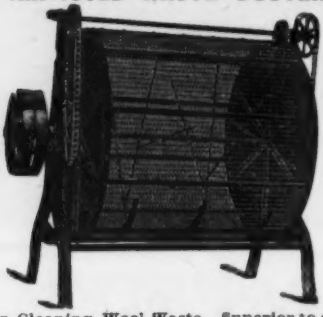

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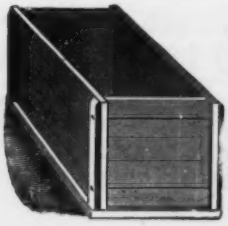

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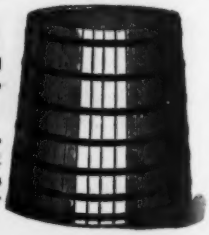

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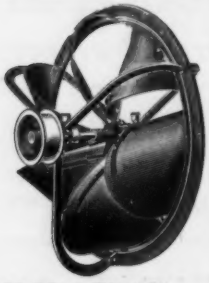

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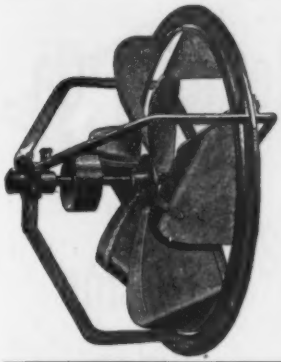

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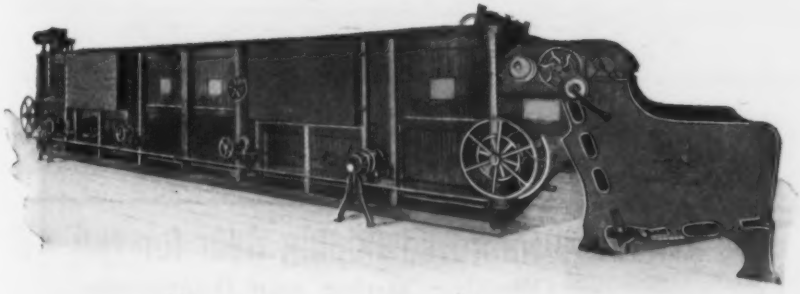

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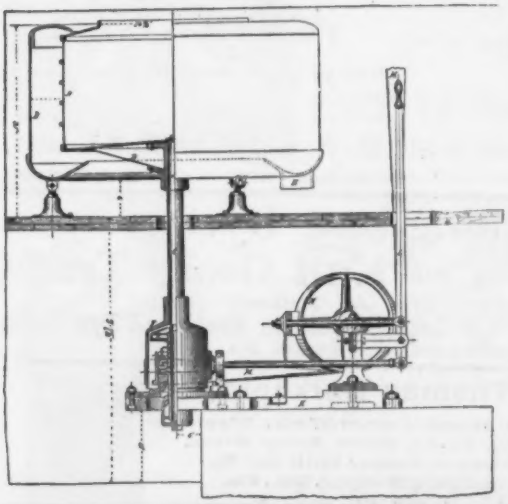

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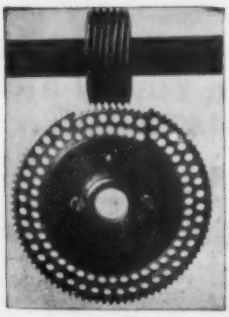

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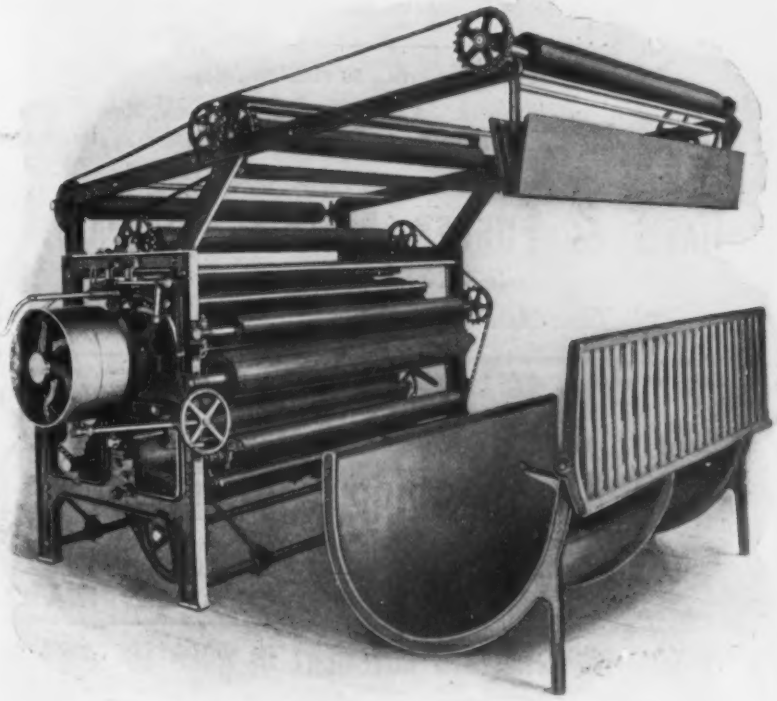

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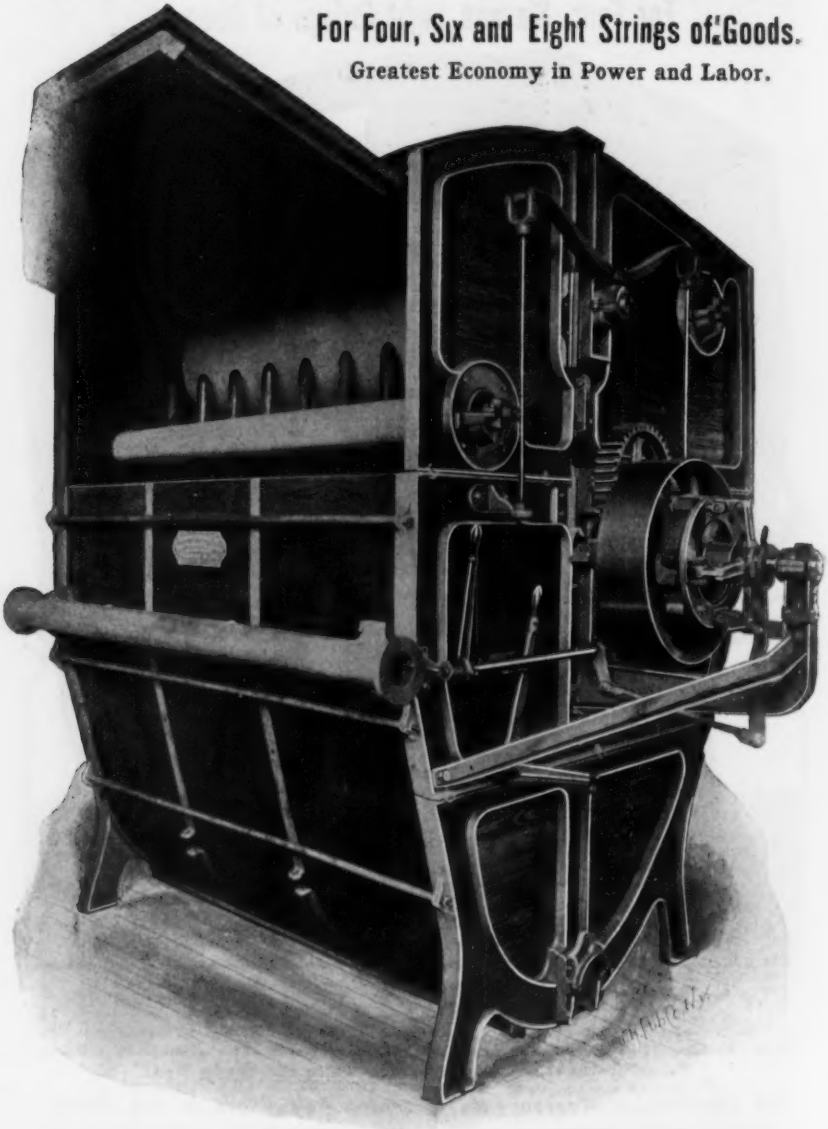

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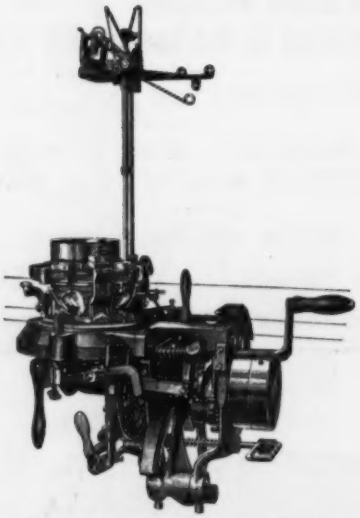

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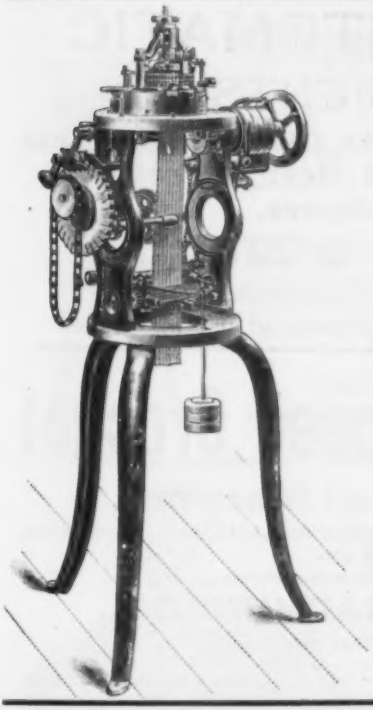

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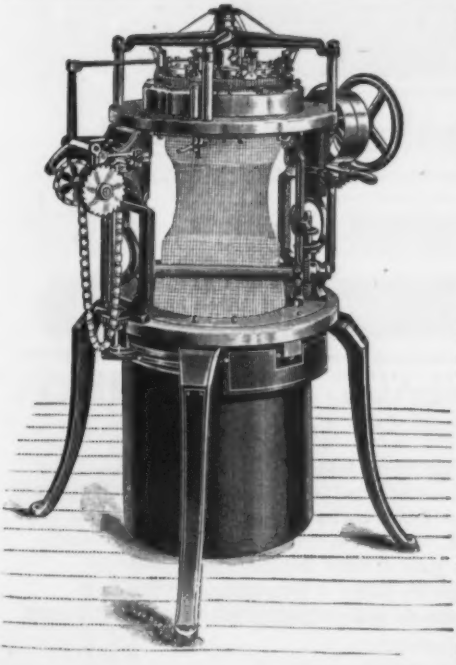

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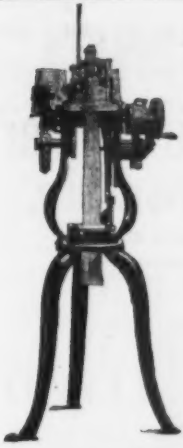

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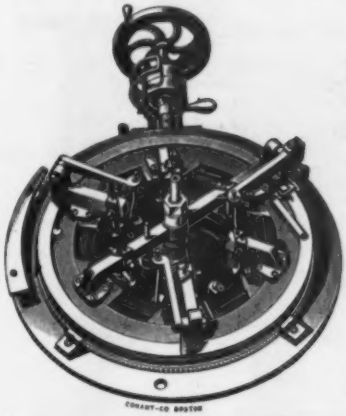

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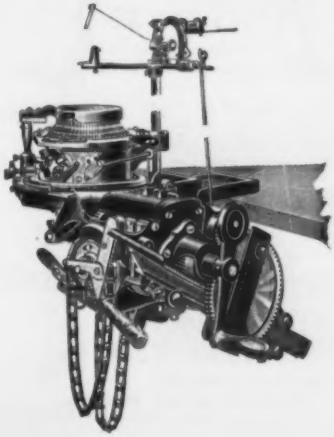

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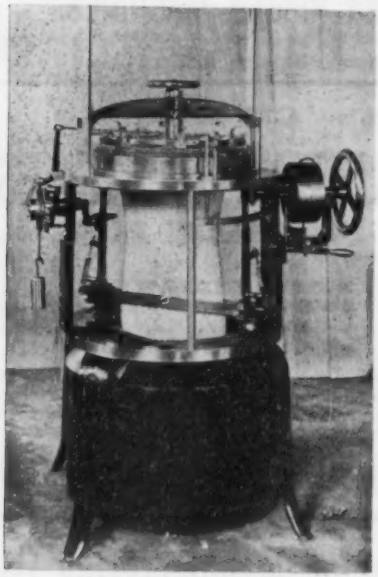

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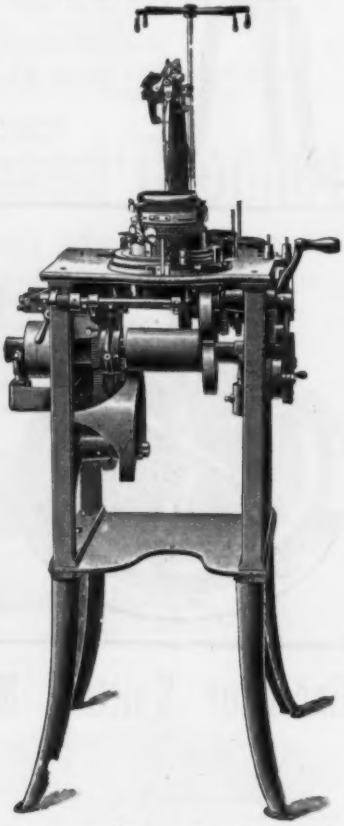

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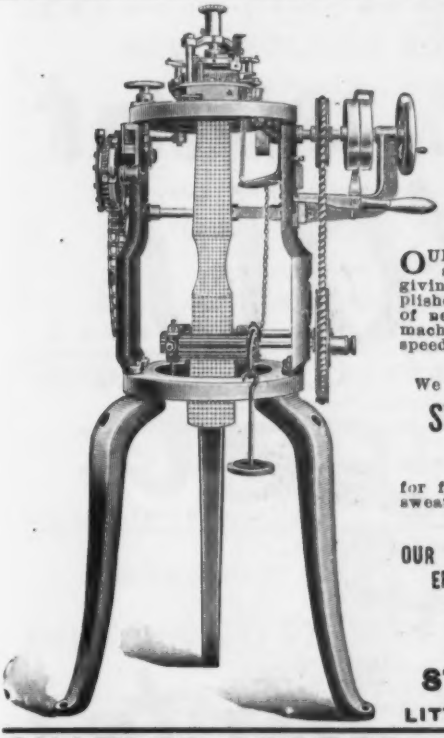

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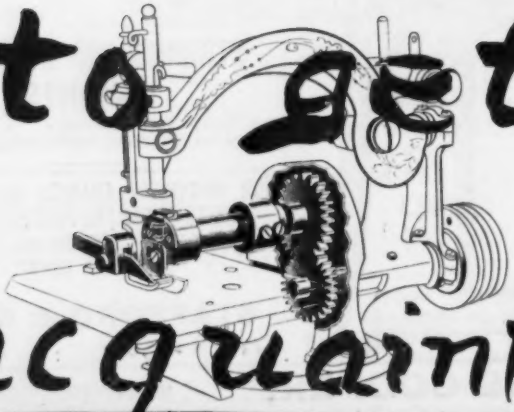
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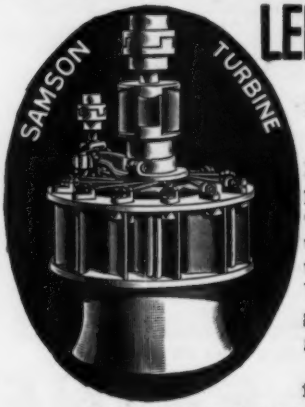

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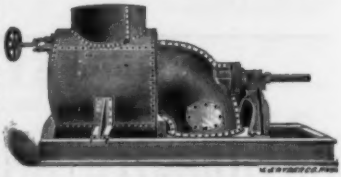

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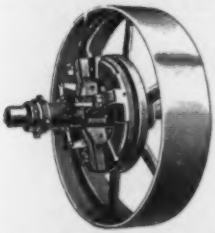

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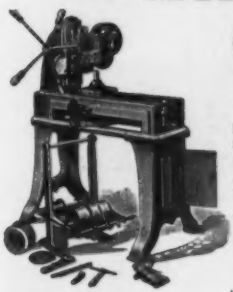

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